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Santa Barbara

Part One:
Ferrari's 'Les Arythmiques'
Part Two:
Brief Analysis of the Author's Compositions

A dissertation submitted in partial satisfaction of the
requirements for the degree Doctor of Philosophy in Music

by

Ori Barel

Committee in charge:
Professor Clarence Barlow, Chair
Professor Curtis Roads
Professor JoAnn Kuchera-Morin

June 2017

The dissertation of Ori Barel is approved.

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Clarence Barlow, Committee Chair

May 2017

Analysis of Luc Ferrari's 'Les Arythmiques' and of the Author's Compositions

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by
Ori Barel

DEDICATION

This work is dedicated to my parents, Dan and Miriam Barel, for their immense, kindhearted support throughout all the years of my studies.

ACKNOLEDGMENTS

I want to profoundly thank Clarence Barlow for his unconditional support throughout all my years at UC Santa Barbara. I would also like to deeply thank Curtis Roads and JoAnn Kuchera-Morin for their great commitment, invaluable time and help.

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REDCAT – 'In a Tube' (Andrew Tholl)

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Ballhause, Berlin – 'Walkie-Talkie' for contrabass and piano.

CalArts – 'Town' for mixed ensemble (Ear Unit).

UC Santa Barbara – 'Artificial Kitchen' for recorder and fixed media (Lucia Menze).

UC Santa Barbara – 'Out' for flute and fixed media (Anne La Berge).

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PUBLICATIONS

‘Small Town’ for solo piano – Centaur Records 2017

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English, Hebrew, Spanish

ABSTRACT

Analysis of Luc Ferrari's 'Les Arythmiques' and of the Author's Compositions.

by

Ori Barel

Part A of this document is an analysis of movements one and two of the electronic work 'Les Arythmiques' by Luc Ferrari. This dramatic work is one of Ferrari's major pieces from his last decade. The analysis uses spectrograms as well as sound clips to point out important moments in the piece. Part B is a brief exploration of the author's compositions that are in Appendix D (portfolio of scores). Part B shows the compositional methods chosen for each piece. Some of the techniques used in Part B explore the use of Cellular Automata, Markov Chains and Fibonacci Numbers. This part shows the purposefulness to get a specific result by using a particular method that would suit the overall envisioned aesthetic.

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Part 1

Analysis of Two movements of
‘Les Arythmiques’ by Luc Ferrari

1.1 Background on Ferrari and 'Les Arythmiques'

Luc Ferrari's contribution as a composer of the 20th and 21st century is indispensable. His approach was unique and ahead of its times. He added techniques to the field that were unprecedented but above all was a pioneer in incorporating loops to electronic music. His refreshing attitude and insistence that serious music could be intimate, humorous and anecdotal undetached from every day life is unparalleled. 'Les Arythmiques', one of his last works, is a personal work as it deals with Ferrari's heart arrhythmia. The linearity of the narrative in this piece is not a typical Ferrari work and its atmosphere is heavy and eerie. 'Les Arythmiques' manages to incorporate various aspects of Ferrari's language in a novel way. It is a profound compositional achievement and a major contribution to the field of electronic music.

The Backdrop For 'Les Arythmiques'

The liner notes for 'Les Arythmiques' have a programmatic element. They provide an intimate glimpse of what the piece deals with (Ferrari 2009). They have a few points that are important in order to understand the piece in a more nuanced way. On the liner notes for the compact disc Ferrari writes the following:

"The morning of May 29, 2003
when I awoke
I could not breathe any more
I was taken to the emergency room, and there I was told that I had cardiac arrhythmia.
They made me an electrocardiogram and they showed it to me.
I found that the arrhythmias were not very interesting.
That I could do better

At this time I decided to make an electro-acoustic composition that would be called *The Arrythmias.*

Then I was told.
To restore the cardiac rhythm an electric shock should be made.
I was put on a traveling bed
I waited in a rather cold corridor for two hours

I was finally anaesthetized and probably received an electric shock that I do not remember
This is why, while leaving the hospital
I tried to reconstitute in the studio the sound of the shock that I had not heard
With this sound coming back periodically, each time I change the scene
I impressed the rhythm on the composition.

This composition, peculiarly, is listened to from start to finish.
But I tried that one remembers it backwards.
As I revisited a village in Italy, here, I tried to go back in time.

It is not Easy

Luc Ferrari
May 5, 2005”

A few important points are informative for the piece in terms of the compositional process as well as the narrative and conceptual aspects of the piece. The following points are related to ideas in the piece as well as specific techniques that the composer uses. Many times the two overlap. The clips for 'Les Arythmiques' can be found in Appendix B. The first two clips are the entire first and second movements of the piece. Thus sound excerpt **A.1** is Movement 1 and sound excerpt **A.2** is Movement 2.

1. Arrhythmia

Arrythmia means that the heartbeat of a person has an irregular pattern. It can be too slow, too fast or simply irregular. Ferrari got the idea for the piece due to his medical condition. Les Arythmiques features irregular rhythmic patterns all through the piece. The jittering rhythms appear by irregular transients from various sound worlds. As Ferrari point in the liner notes: 'I decided to use all the sounds that I had recorded on journeys these last years. While making them arrhythmic'. This results in relatively passive sounds that suddenly 'jump' in volume and become very expressive full of gesture on the verge of a violent aesthetic. Ferrari makes a connection between the irregular rhythms of the heart and the scenery of the past. The piece turns into a kaleidoscope where the scenery changes periodically in unexpected ways. As Ferrari points out: 'I thus had time to reflect. And as one says of a drowning man's life passing before him.' And yet, the flashbacks are distorted offering an invented, imaginative hyper-reality rather than a traditional flashback (Roads 2015).

2. Electric Shock

The electric shock that Ferrari mentions in liner notes of the CD seems to appear throughout the piece. This electric shock is the idée fixe of Les Arythmiques. I refer to in my analysis as the 'electric pulse'. In the liner notes of the CD, David Grubbs speculates that Ferrari talked with him in the hospital on how he worked for days in order to recreate the sound of the electric shock that was used in order to treat his Arrythmia: "What sound had been thwarting him that day? In the hospital, he had been given an electric shock to treat his arrhythmia. The sound that he was doggedly trying to create was that of a jolt of electricity, sent across the heart. I didn't know until reading Luc's notes for Les Arythmiques several years later that he had been unconscious during the procedure, and that he was engaged in creating a sound from his imagination. The sound that he finally crafted to his satisfaction is the crackling, vaguely terrifying one that jolts Les Arythmiques into life and reappears throughout to interrupt the proceedings at the most unlikely moments."

3. An Additive technique

Ferrari works constantly with addition and retention. He constantly adds new motives in this piece that belong to a new category after the listener becomes used to a certain sound or passage. He foreshadows events and also works in associate ways. For example the different 'pulses' in the piece are all related to each other.

4. Imaginary flashbacks with field recordings

Ferrari's tone is definitely dramatic in the following sentence: "And as one says of a drowning man's life passing before him". What symbolizes his own memories or flashbacks is his decision to use recordings from his past journeys ("I tried to go back in time", followed by the last sentence "It is not easy"). Ferrari, takes these anecdotal recollections and creates a sense of distressing melancholia. As Grubbs points out: "Les Arythmiques ultimately moves beyond the hospital room by delving into an archive of remembered

sounds." Grubbs also points out that part of the material is from the recordings of the village in Italy but also from "the American Southwest for his *Far-West News* series". These are not flashbacks. Ferrari intersects illogical combinations of spaces and sounds that because of their concreteness appear purely logical. This aesthetic echoes magic realism.

5. Magic Realism

One can sense the influence that cinema had on Luc Ferrari. In his book 'Composing Electronic Music: A New Aesthetic", Roads compares a piece of Ferrari to the montage of Jean-Luc Godard and his use of the jump cut. As Roads points out the narrative emerges in a non-continous way, without a clear beginning middle or end. It is associative and reminiscent of films that used associative techniques (e.g. late Bunuel, Fellini or Godard). Ferrari's use of narrative blurs the lines between realism and surrealism. The result is more related to Magic Realism. In Magic Realism the detailed and sometimes dry realism can become too hard to believe, too abstract, strange and at times humorous as a result. The combination of Ferraris' detailed documentation and his anecdotal approach in conjunction with the abstract mixing results in magic realism.

6. Symbolic Elements and confused identities

There are many symbolic elements in this piece. For example the church bells, elements of motors and cars that 'ignite' the flashbacks, animal sounds, and above all the horse riding scene towards the end of the final climax of the piece. Another recurring element is the use of various languages together that create clashes. The aesthetic of combining different spaces together in a highly artificial manner is also an element of confusion. These elements of uncertainty and confusion, challenge the listener both cognitively and symbolically.

7. Loops

As Roads points out, loops are Ferrari's signature. Ferrari uses multi-layered loops creating abstract textures and shapes. At times the loops are a backdrop and work as an ostinato. Other times they come into the foreground and are very gestural. In 'Les Arythmiques', this happens particularly with speech, motorcycle engines and bells.

8. Cinema For The Ears and field recordings (Sound design)

The listener is thrown into a multi-layered atmospheric reality. However, each sound is carefully picked and planned and gathers meaning and momentum (Roads). The sounds become direct experiences rather than representational ones. As Roads explains about 'Presque Rien': 'We experience the sound sources so the signification is direct'. Likewise this happens in Les Arythmiques except that here, we are in multiple locations all at once. It can be argued, that the certain listeners will constantly re-configuring and make assumptions about the locations and characters that 'live' in the piece as they listen to the piece. In the recording process Ferrari takes a role of a documentary filmmaker, but once the material is edited it becomes abstracted and the story does not follow a linear direction but only appears to be linear – an illusion of reality.

9. Humor/Irony

Ferrari's slapstick humor is somewhat grotesque in this piece (for example a voice of a character saying 'basta' - enough), or repetitive nagging sounds that create a humorous tension that is more tragic than comic. As David Grubbs point out about the piece: 'I can't think if any of Luc's works that are stamped by dread in the same manner as Les Arythmiques. Luc's characteristic humor is here particularly in the superimposition of diverse sound enviroments. But Les Arythmiques also possesses a nagging unease, a persistent gravity that both listener and composer cannot shake.'

10. Silence/Chance

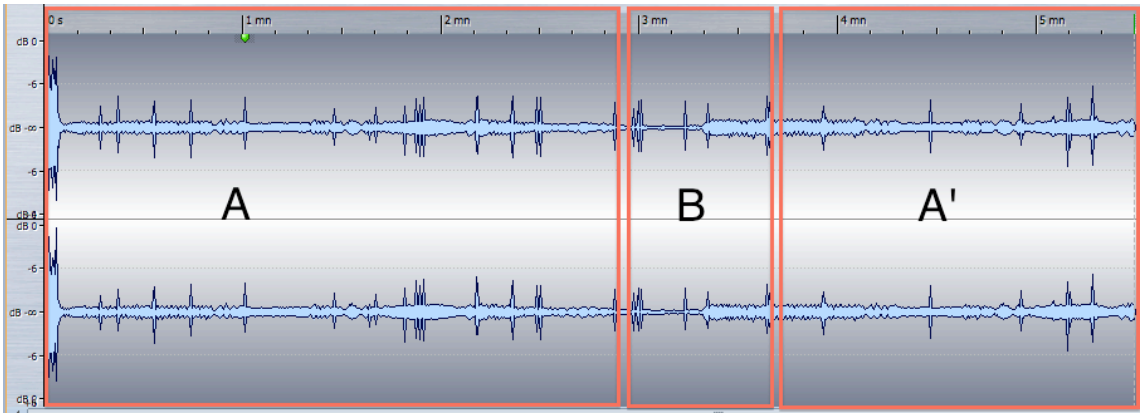
Ferrari's influence from John Cage is evident in pieces like 'Presque Rien'. Even the title 'almost nothing' is reminiscent of Cage's famous lecture ('Almost Nothing'). The approach is also manifested in Ferrari's minimal alteration with effects on his field recordings. For example, the approach of 'Pesque Rien' can be compared to an acoustic piece like Feldman's 'The King Of Denmark'. Feldman who was part of the New York School movement and close to Cage, was also inspired by being inclusive of environmental sounds and silence. Consider the following remark by Feldman: "I actually remember writing The King - on the beach on the south shore of Long Island and I wrote it in a few hours, just sitting comfortably on the beach. I wrote the whole piece on the beach. And I can actually conjure up the memory of doing it - that kind of muffled sound of kids in the distance and transistor radios and drifts of conversation from other pockets of inhabitants on blankets, and I remember that it did come into the piece. By that I mean these kinds of wisps. I was very impressed with the wisp, that things don't last, and that became an image of the piece: what was happening around me. To fortify that, I got the idea of using the fingers and the arms and doing away with all mallets, where sounds are only fleetingly there and disappear and don't last very long." (Williams 1983). Although the two pieces have very different results they share some aesthetic characteristics.

11. Anecdotal Music

Besides loops, Ferrari's contribution to electronic music lies in the integration of social elements. Until Ferrari, electronic composers would mainly record sounds and treat them as notes. In a sense, recapturing the modernist instrumental music aesthetic (Caux 2012). However, Ferrari treated these sounds more like a documentary director. Ferrari laid the ground for electronic composers to search the social and anecdotal rather than the purely abstract in electronic music. One can compare this to the approach of painter Jean Dubuffet who was also interested in the anecdotal and in the celebration of simplicity of every day life events.

1.2 ‘Les Arythmiques’ - First Movement

Overview of the form (very broad)



1. 0-2:52 A

   Drone with pulses.

2. 2:52-3:40 B

   Field recordings. Drone goes away.

3. 3:40-5:29 A’

   Drone with pulses comes back.

Main elements of Part A

1. Recurring short pulse lasting a few milliseconds with strong amplitude
2. Recurring short pulse lasting a few milliseconds with lower amplitude
3. A static drone providing harmonic context
4. Rhythmic element with varying speeds
5. Field recordings in the background (almost unrecognizable)
6. Introduction: burst of sound that ignites the piece (0-4)
7. Rhythmic sustained frequencies around 526Hz shifting in tremolo-like effect.

Part A can be dissected into two parts A1 (00:00-1:00) and A2 (1:00-2:52)

Movement 1 - Part A1 (0:00-1:00)

A burst of sound marks the beginning of the piece. A drone like pattern appears around 51Hz all throughout Part A and Part ‘A (Figure 1-1A-1).

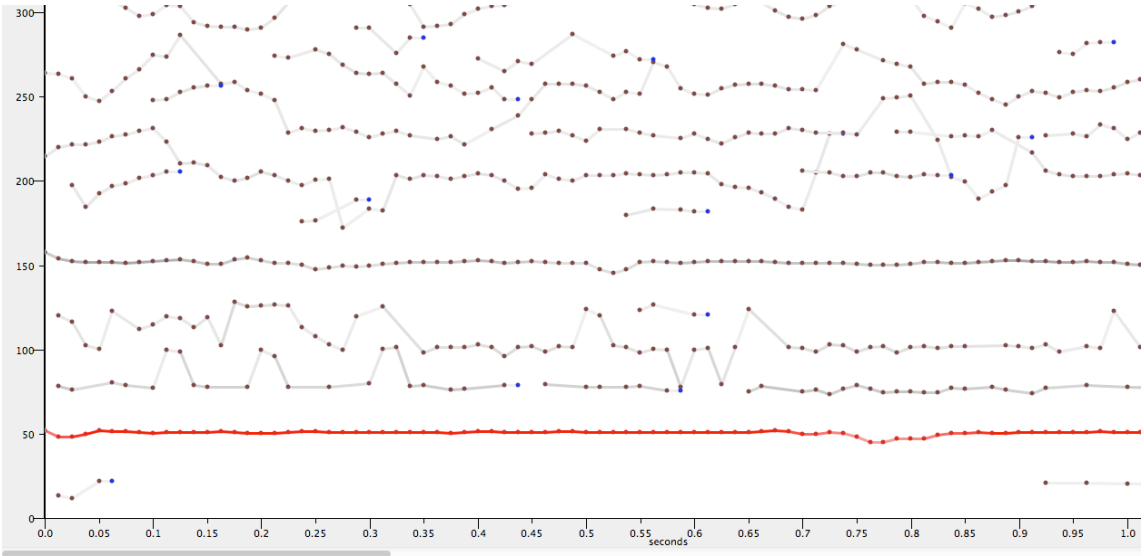


Figure 1-1A-1 (0:04-0:05)

This drone consists mainly of the following frequencies (51, 102, 152 Hz - an octave and a fifth). The lowest note of the drone is highlighted in red. This drone is around 51Hz, an A flat. An important feature of this drone: it constantly moves in tiny increments of cents either up or down by using glissandos in the micro scale. The cognitive result is that the listener is constantly intrigued by consonance and dissonance. Sound excerpt A.3 is the opening of the Movement 1.

The main compositional idea of Part A is that Ferrari inflicts rhythms on the frequencies that are the same as the frequencies of the drone. These pulses are loud and short. They seem to strike out of nowhere, create surprise, momentum and anticipation for the next pulse. The pulses appear in unpredictable moments that are random and yet seem deterministic in character. We can see in the figure below the pulse highlighted by the arrow. Some of its

notable frequencies are 48, 105, 210, 315, 526 Hz. (Figure 1-1A-2). Sound excerpt A.4 belongs to this figure.

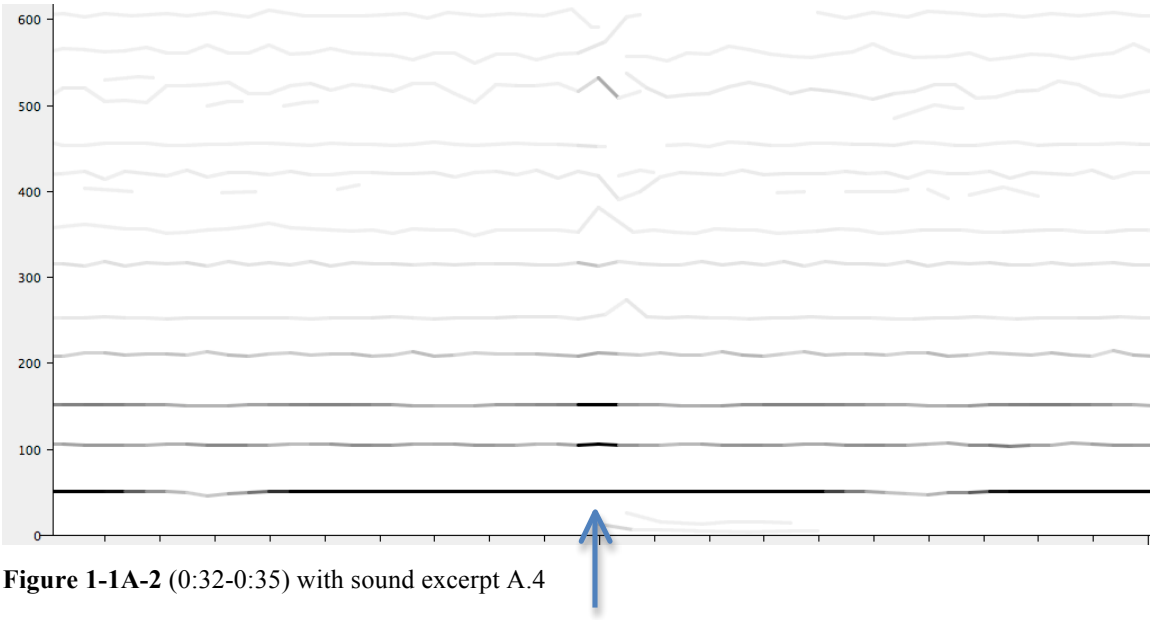


Figure 1-1A-2 (0:32-0:35) with sound excerpt A.4

In Part 1A the loud pulses appear in the following seconds: (00:16, 00:22, 00:32, 00:44, 01:00). Thus there is an expansion of time of 6,10,12 and 16 seconds. The soft pulses appear in the following seconds: (00:05, 00:11, 00:27, 00:38, 00:49, 00:54). Unlike the loud pulses, the soft pulses expand in time, stay the same, and finally contract (6,16,11,11,5). There are 5 strong pulses and 6 soft pulses in total. The temporal places of the pulses and the intricate combination of strong and soft pulses, keeps the listener attentive. But above all the gesture of the strong pulses has an almost shocking effect. It emerges from background to foreground in a sharp way leaving the listener unguarded. Part of what contributes to this effect has also to do with a rich variety of amplitudes mixed together. The mix is extremely detailed from very soft to very high levels with various layers. The pulses in the foreground are very loud compared to the background, but because the background is so detailed in amplitude we tend to focus on examining or dissecting it. Once the pulse kicks in it distracts our attention to a different perception.

Movement 1 - Part A2 (1:00-2:52)

Part A2 is more random. On one hand there is more space between the pulses. On the other hand, the pulses appear one after the other up to 3 times in a second. The strong pulses appear in the following seconds: (1:27, 1:38, 1:40, 1:49, 1:52, 1:53, 1:54, 2:10.696, 2:10.793, 2:21.447, 2:21.556, 2:21.680, 2:28, 2:29, 2:52). The strong pulses appear now in a very different timescale than Part A1: (11,2,9,3,1,1,16,0,11,0,0,0,7,1,23).[1]

There is a combination of the macro and micro scale. The macro scale is seen by large second gaps and the micro by pulses that appear simultaneously after 1 second or only after a few milliseconds. The lower amplitude pulses appear in the following seconds: (1:05, 1:11, 1:16, 1:22, 1:27, 1:33, 1:44, 2:00, 2:05, 2:16, 2:27, 2:32,2:37,2:44). Again it is interesting that the lower amplitude pulses are by far more regular than the stronger amplitude pulses.

The most notable aspects in part 1B are: the large gaps and very short gaps between pulses, the repetition of either 2 or 3 pulses in a row, the technical virtuosity in the variations on the sound of the pulses (particularly in the various forms of attack and envelope), the beginning of a hidden field recording that is brought up slowly in amplitude around 2:17 and the various sustained sounds. The sustained sounds fluctuate by tiny glissando increments around 526Hz. They create a rich contrast to the short pulses. This frequency (526Hz) acts a bit like a mask, sometimes it is sustained and sometimes it emerges from background to foreground and vice versa.

Part 1A appeared to be more stable because of its regularity. Part 1B is less regular and unexpected. The irregularity makes the listener in a perplexed state. Although the piece is very minimal, Part 1B leads to a mini climax and this results in Part 2 where the drone drops and the field recordings come in.

Thus, intentionally the composer leads the listener into a journey where field recordings interact with one another in an imaginative way by form of collage (much like in the technique of Ferrari's 'Almost Nothing' and many other pieces by him). The result can be seen is as if the field recordings appear in the protagonists' mind suggesting magic realism in music.

Movement 1 - Part B

Main elements of Part B

1. The ostinato from Part A drops
2. Field recordings 'substitute' the ostinato
3. Introduction of 'acoustic pulses'
4. Element of glissando going down in pitch
5. Reverberation in pulses gone

Movement 1 - Part B (2:52-3:30)

In this part the ostinato drops and the field recordings gain presence. In a sense they are replacing the function of the ostinato from Part A. For the first time, the pulses also become acoustic. There is no doubt that the acoustic pulses are referential to the electronic pulses from Part A. The first acoustic pulse appears in 2:57. The short sound, which lasts about 130ms, seems to be some kind of engine but it is impossible to determine since it is so short. In later chapters, these acoustic 'pulses' will become more prominent. However, Ferrari plants the seed in this chapter.

The electronic pulses remain; however, reverb is not used on them and they appear to be purposefully detached from the new layer of field recordings. The lack of reverb and sudden dryness is a powerful gesture in this part.

The change of texture as the ostinato drops in Part B is definitely dramatic. There is a drop of pitch of a minor third in 2:56 that sounds like the sound of an engine followed by the first 'acoustic pulse' in 2:58 (Figure 1-B-1). Sound excerpt A.5 belongs to this figure.

Both of these two elements (drop of pitch and acoustic 'pulse'), are emphasized with arrows.

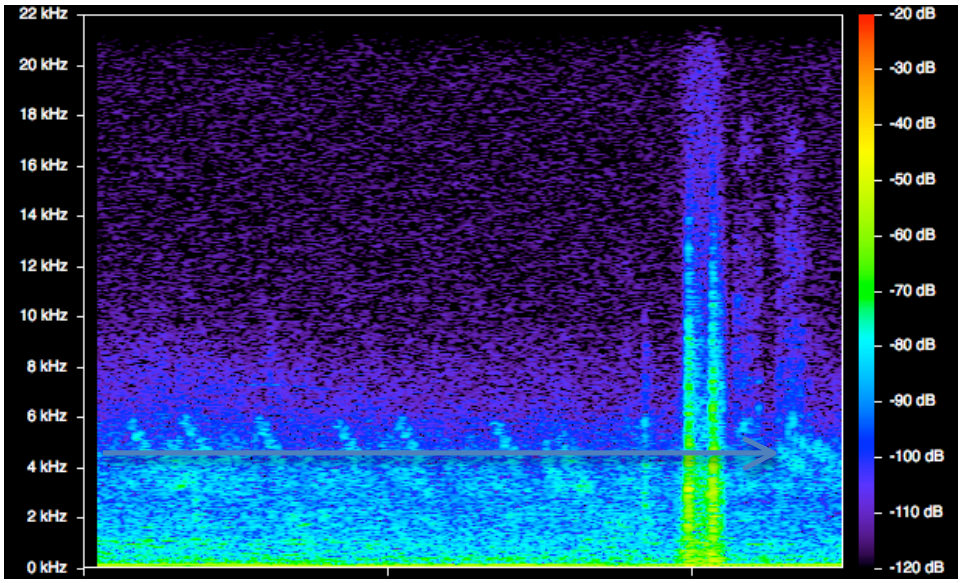


Figure 1-B-1 (2:56-2:58.500) with sound excerpt A.5

The dry 'synthetic pulses' along with the field recording as the ostinato drops causes an eerie effect: it's as if there are two realities that are very contrasting and disconnected.
In the article: "'I' tunes: Multiple Subjectivities and Narrative Method in Computer Music" by Elizabeth Hoffman (Hoffman), the author examines how electronic music can easily create alternate sound world belonging to different realities very much like in film. Hoffman comes up with four propositions that electronic music can elicit: "Proposition 1: There is only one universe, ours. Any fictional one is a substitute, extension, or hidden aspect (including a memory) of the "real." Proposition 2: There are two closed universes, the

original and a simulacrum. Proposition 3: There are two closed universes, the original and a fabrication. Proposition 4: There are two or more distinct universes that are mutually permeable. Characters from any of these universes may communicate or move across frame boundaries."

This illustrates Hoffmans' point specifically when Ferrari decides to take the reverb out of the 'synthetic pulse', which causes a more direct connection with its protagonist (perhaps because it does not blend with the new texture and appears purposefully so detached). The dramatic occurrence happens because the listener is so used to hearing the pulse in conjunction with the drone, that when the drone departs from the pulse, an unsettling effect happens. Literally the ground (low frequencies), are gone and only the high frequencies replace the bass. This is a very disorienting nuance. Yet the peaceful sounds of the field recordings evoke a further mysterious character as if moving from one perception to another. Thus in Elizabeth Hoffman's logic this fits proposition no. 1: "There is only one universe ours. Any fictional one is a substitute, extension, or a hidden aspect (including a memory) of the 'real'.

This contrast between the field recordings and the 'synthetic pulse' is dramatic in its unsettling quality as if two worlds intersect in a surreal discontinuous way. The reconciliation of the two illogical worlds comes in form of a narrative that the listener sets. It works very much like in a film where we pass from one reality to another one. As if a montage between two unrelated events take place in one scene.

Movement 1 - Part A'

Main elements of Part A'

1. Recurring pulse with strong amplitude
2. Recurring pulse with lower amplitude
3. A static drone
4. Field recordings in the background (more recognizable)
5. Sustained sounds

6. Emergence of acoustic pulse as a main feature

Part A' (3:30-5:29)

This part is essentially a recapitulation of Movement 1 - Part A. However, what is important is that the acoustic pulses become much more vivid. There is a transformation now when Ferrari introduces a much more rich type of pulse. It is impossible to know exactly what is the source of this fast sound (to me it evokes the sound of birds).

One thing is certain; it has a lot of motion to it and may evoke imagery of a very fast event. I will call this type of pulse 'bird pulse'. The 'bird pulse' appears in the following seconds: 3.56, 4:05, 4:56, 5:05, 5:16. The strong synthetic pulses appear in 3:55.550, 4:28 (in 4:28 there are two in a row by milliseconds), 4:55, 5:09, 5:10, 5:17.

Part A', has almost the exact numbers of loud synthetic pulses that Ferrari uses in Part 1A. Another interesting point is that the bird pulses usually react to the synthetic pulses as they come immediately after they appear (Figure 1-A'-1). Sound excerpt A.6 belongs to this figure. Notice in this figure the synthetic pulse striking and right after the 'bird pulse' comes in (both marked by arrows).

Only in one instance the bird pulse appears first. Also the 'bird pulse' appear at some point by itself autonomously just like the synthetic pulse. This is important because in Movement 2 the acoustic pulses are no more dependent on the synthetic pulse. Yet, because of this long exposition, the listener is forced to have a sense of hierarchy and the acoustic pulses always bring to mind the synthetic pulse in a very hierarchical way. In a sense the synthetic pulse gives birth to all the acoustic pulses. Because there is such a programmatic aspect to the piece due to the biographical notes that Ferrari writes in the compact disc, I would argue that the synthetic pulses belong to the world of the hospital while the acoustic world operates like a game of memories inside the protagonists' mind. This idea clearly echoes Hoffmans' essay in which she shows that the electronic medium can easily evoke these nuances with the help of field recordings (Hoffman).

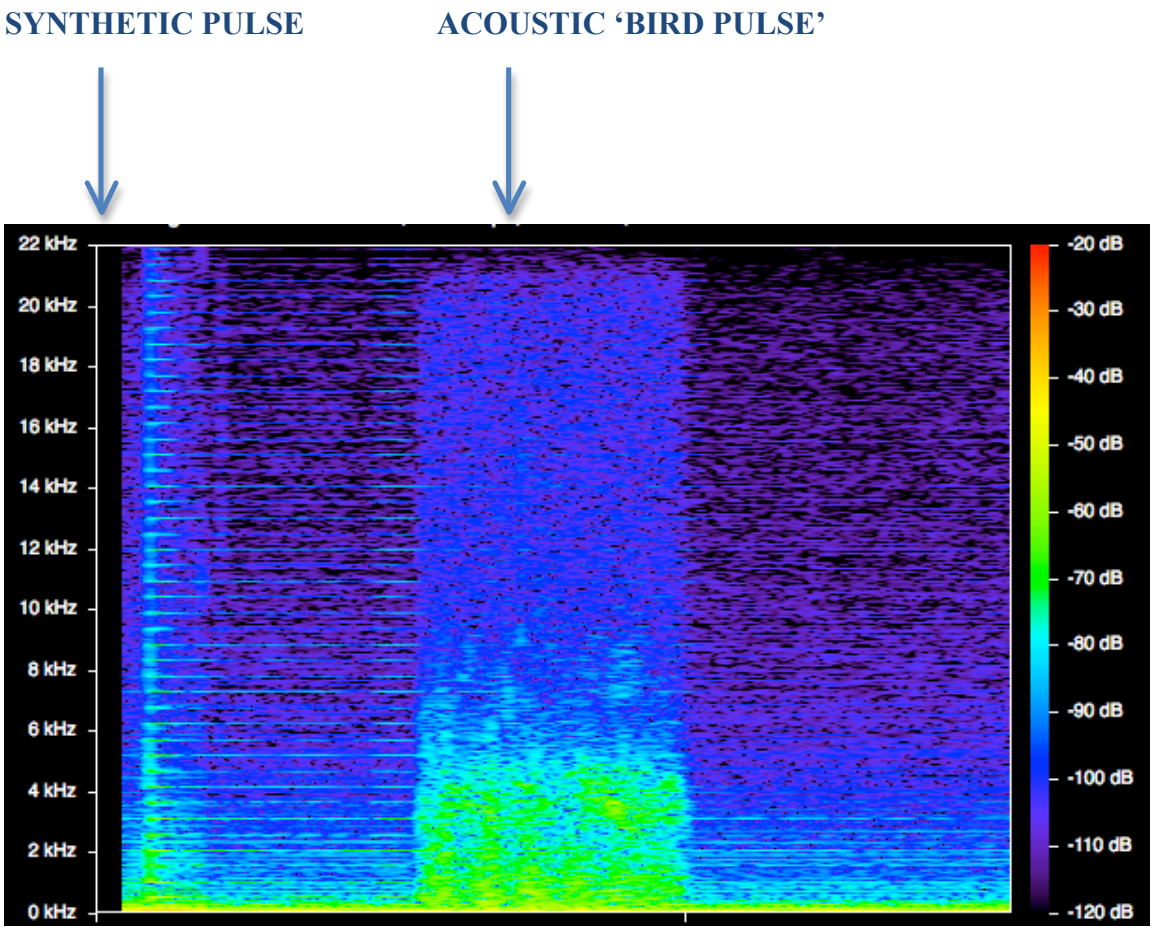
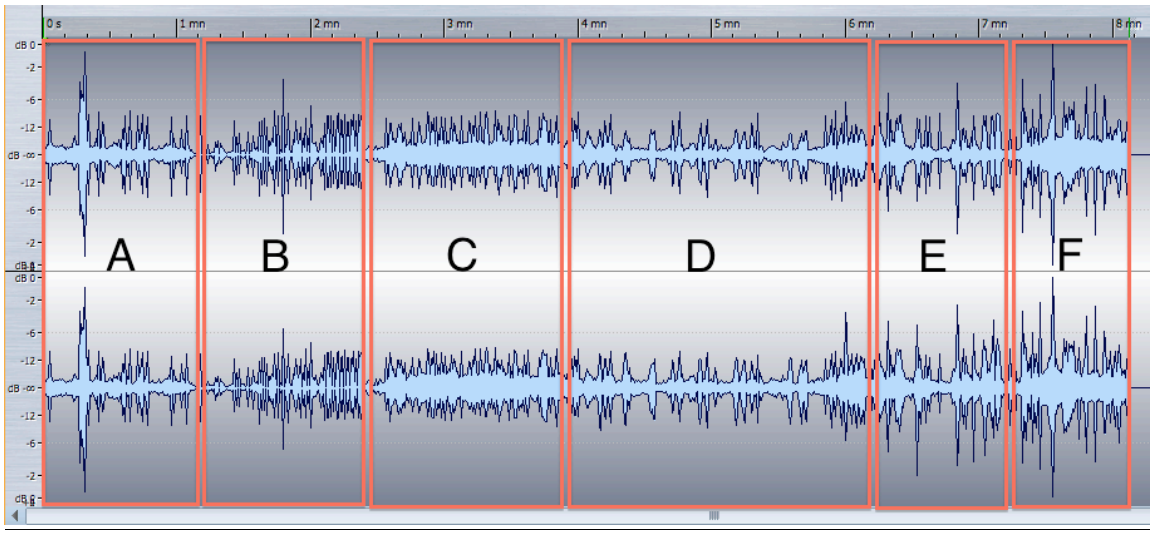


Figure 1-A'-1 (3:55.500-3:57) (notice the limited spectrum in frequencies in the acoustic pulse) with sound excerpt A.6

1.2 ‘Les Arythmiques’ - Second Movement

Overview of the form (very broad)



1. 0-1:10 A

   Field recordings of engines replace pulse motive. Drone in background.

2. 1:10-2:25 B

   Drone goes away. Field recordings with synthetic pulse. New rhythmic motives.

3. 2:25-3:51 C

   Atmospheric-part (cinema for the ears). Drone changes.

   Church bell melody loop.

4. 3:51-6:10 D

   Transformation of drone. French horn sustained note. Church bell loop.

5. 6:10-7:16 E

   Field recordings. With motive of sudden amplification of amplitude, Engine motives come back.

6. 7:16 -8:07 F

   Synthetic drone with pulses comes back in a transformed way.

   Preparation for Movement 3.

Movement 2 - Part A

Main elements of Movement 2 Part A

1. Motive of Introduction comes back. It restarts a new phase in the piece.
2. Engine sounds prolonged acting as sustained sounds
3. 'Engine Pulse' mimicking synthetic pulse
4. Loud Synthetic pulses from track 1
5. A static drone from track 1
6. Rhythmic sustained frequencies around 526Hz shifting in tremolo-like effect.
7. A conflicting drone. Marking the beginning of a transformation in tonality

Movement 2 - Part A (0:00-1:10)

In 00:16 the motive of introduction comes back. Its function is quite simple, to mark a new transition and starting the second movement. There is a new type of 'pulse' that was foreshadowed one time in Movement 1. I will call this pulse, "engine pulse". The 'engine pulse' was foreshadowed in Movement 1 Part B at 2:57. Although the 'engine pulse' appeared at an important event in movement 1 it does not repeat in high amplitudes in track 1. The 'engine pulse' replaces the 'bird pulse' in this movement. The engine pulse has a higher frequency range compared to the previous 'bird pulse'. Below we can see the 'engine pulse' (Figure 2-A-1).

In comparison with the 'bird pulse' (Figure 1-A'-1), the 'bird pulse' (Figure 2-A-1) reaches a much higher frequency (about 14Khz compared to 7Khz). Sound excerpt A.7 belongs to this figure. Both motives sound very similar (the bird pulse might use a low pass filter). Still they are not quite the same…

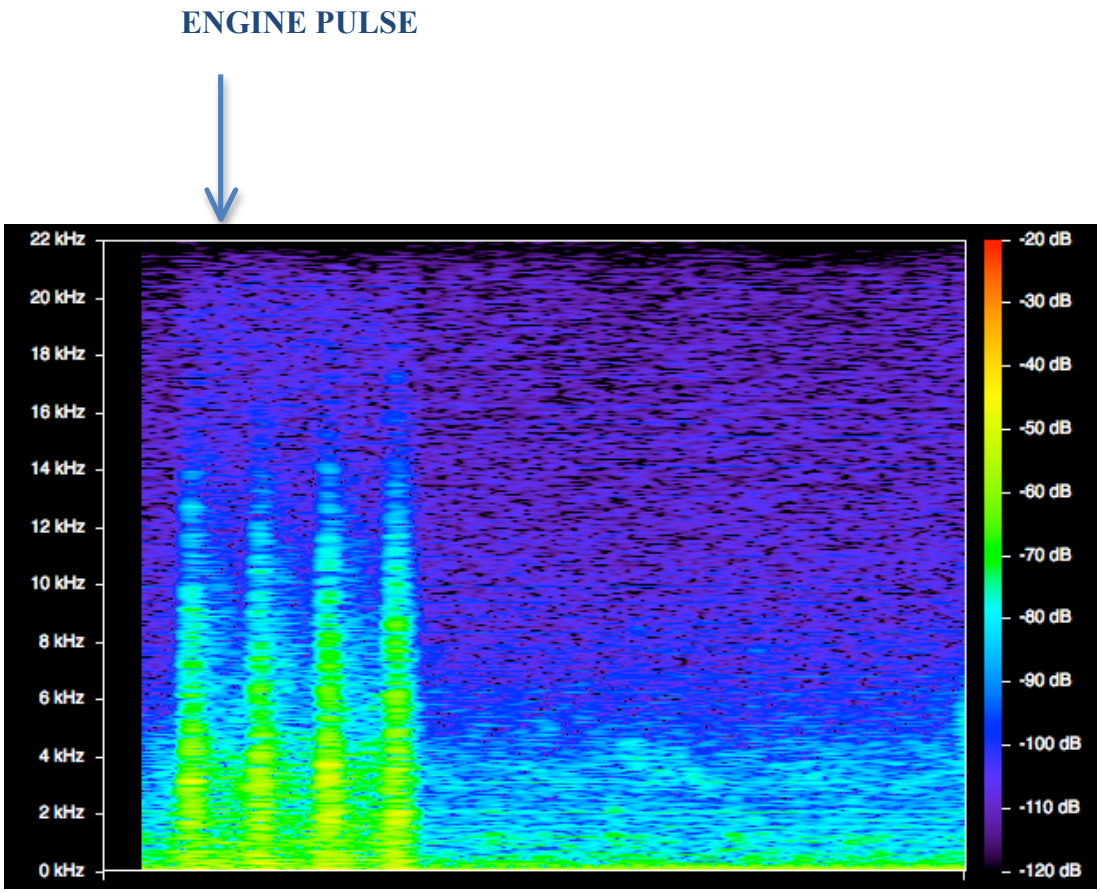


Figure 2-A-1 (39:00-40:00) (notice the spectrum reaching to 14Khz in contrast to the 'bird pulse') with sound excerpt A.7

The transformation that occurs here is that the 'engine pulse' is prolonged. Thus it slightly transforms by becoming a sustained rhythmic entity and still retaining its temporary pulse. Also there is a prolonged 'engine' sound in the background that leads to a percussive attack ('engine pulse' in the foreground). Once a point of sudden attack appears the cycle restarts.

Both movements 1 and 2 use the same technique and both use the same material for prolongation and sudden attack. The result is of a foreground emerging suddenly from the background in a mask like layer. However, the interesting thing is that Ferrari uses a sound that is already unexpected rhythmically. He doesn't have to process it much asides from

using changes in amplitude levels. The use of an engine sound that is already arrhythmic is both conceptual and concrete at once. It is conceptual, because it relates directly to the theme of the piece, and concrete because the listener recognizes the sound. Obviously, there is a virtuosity of imagination by Ferrari when he uses this sound, which, is one of the most interesting parts of the piece. Figure 2-A-2 shows (sound excerpt A.8), is a 10 second segment, where we hear a continuous engine sound, followed by 1.159 millisecond accentuation (‘engine pulse’), followed by the ‘bird pulse’, and finally by a the ‘engine pulse’ which lasts 0.319ms and is a high point in the micro scheme.

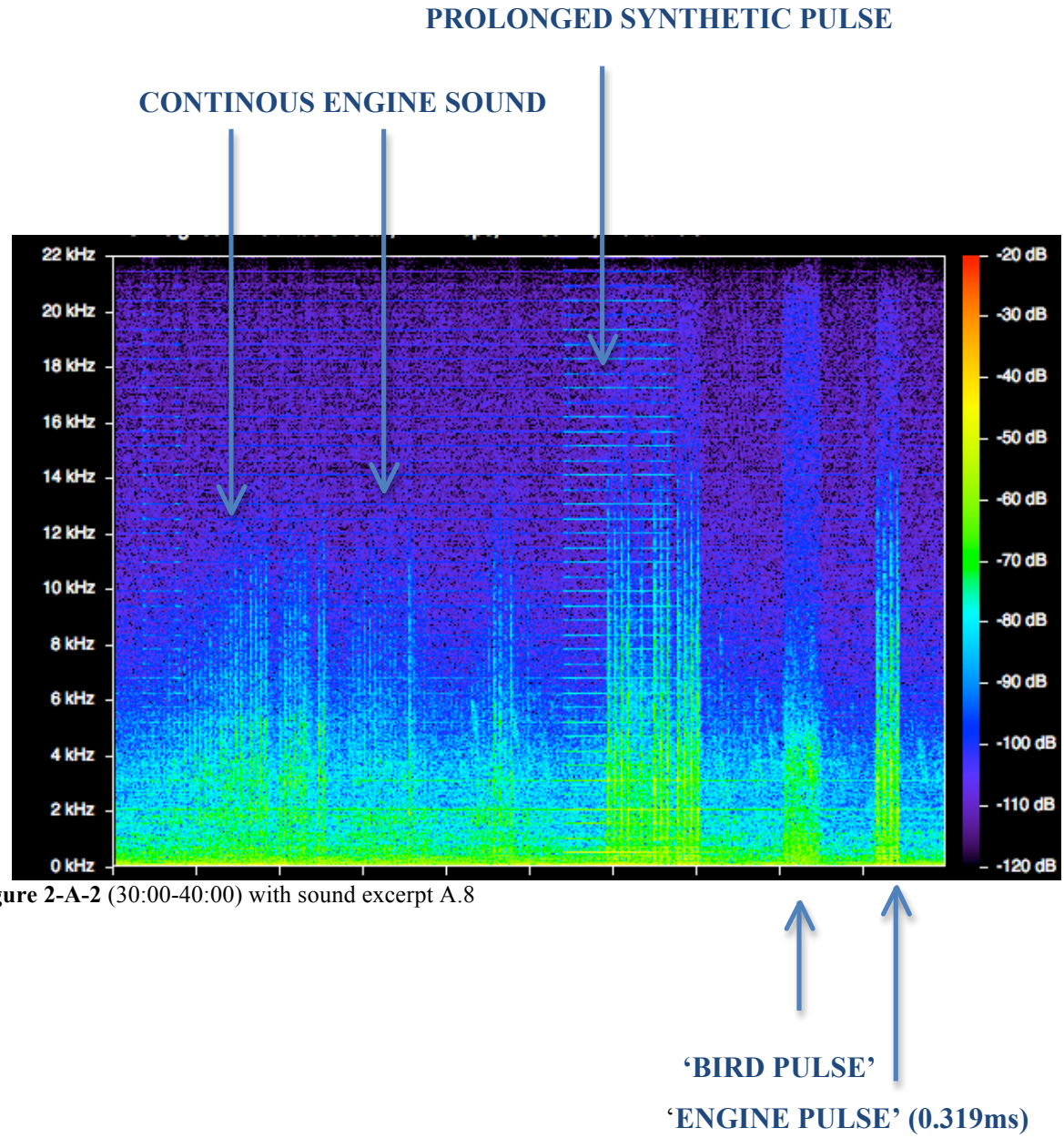


Figure 2-A-2 (30:00-40:00) with sound excerpt A.8

All throughout Ferrari uses sudden amplitude changes that are very gestural and emphasize climaxes on the micro level. Until now the drone from track 1 appears as well as the synthetic pulse. It is now in the background (probably due to the fact that our ears are too used to it until it merges to the background and because of the addition of the 'engine pulse'). From 00:53 to 1:03 we hear a sound that conflicts in dissonance with the drone (this sound can remind of a fly even though it sounds synthetic). This leads to 1:04 where all synthetic sounds start to disappear. Like in the previous movement (Track 1 Part B), the drone disappears. This leads us to track 2 Part B.

Movement 2 - Part B

Main elements of Part B

1. Engine sounds prolonged acting as sustained sounds
2. Synthetic pulse
3. Expansion of bird pulse and engine pulse to a variety of acoustic pulses derived from field recordings
4. Rhythmic Variety
5. Accentuation of very sharp attacks through envelopes

Movement 2 - Part B (1:10-2:25)

This section acts very much like Movement 1 – Part B. The drone drops and the pulses stay. However, this time the pulses completely dominate the passage. The pulses are shorter adding tension as a whole to the passage and piece. There is also a more rhythmic variety in the passage (mainly by the arrhythmic engines). The dramatic change is that for the first time the pulses dominate entirely and at the same time new pulses appear as well.

In the midst of this complex texture, Ferrari maintains a sense of hierarchy: the synthetic pulse as the strongest element, the engine pulse as a weaker element and the random pulses, as the weakest element. Examples of random pulses appear for example in 2:22.745 ms. where all of a sudden we hear the sharp barking of a dog for only 158ms (Figure 2-B-1). Sound excerpt A.9 belongs to this figure.

Also the pulses have now much more sharp attacks through sudden envelopes that are dramatic as they amplify sounds suddenly in a few milliseconds. For example consider a random pulse that has a sudden transient in 1:47.850 ms (Figure 2-B-2). Sound excerpt A.10 belongs to this figure. This section is built out of astounding sounds. There is also a beautiful sense of depth as concrete sounds that are very close and far from the microphone are mixed together creating great detail of resolution. One of the most impressive moments is when we hear a sound that brings to mind flies in 1:57.4ms (Figure 2-B-3). Sound excerpt A.11 belongs to this figure.

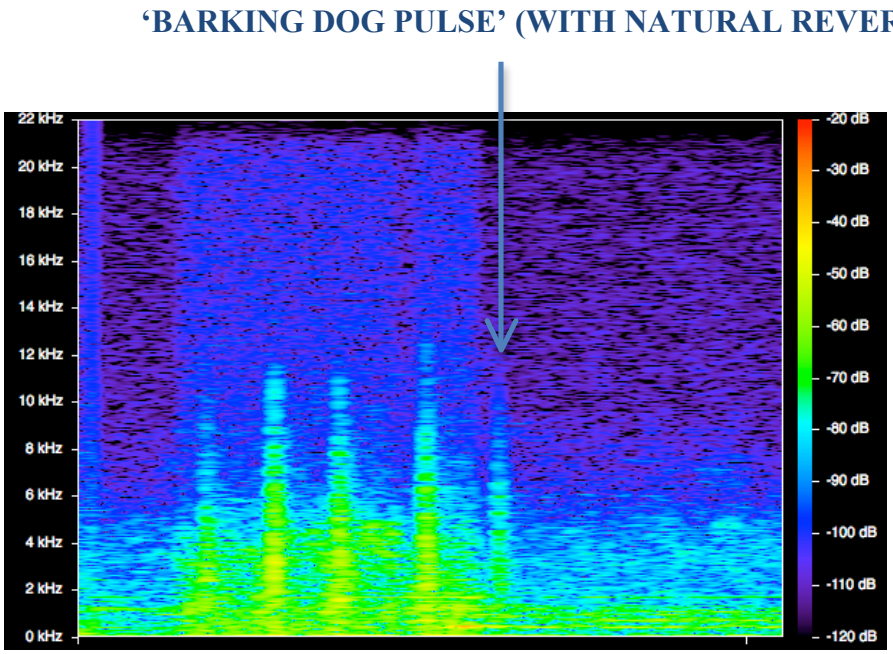


Figure 2-B-1 (2:22.855ms-2:23.799) (notice the 4 engine pulses that lead to the 'barking dog pulse') with sound excerpt A.9

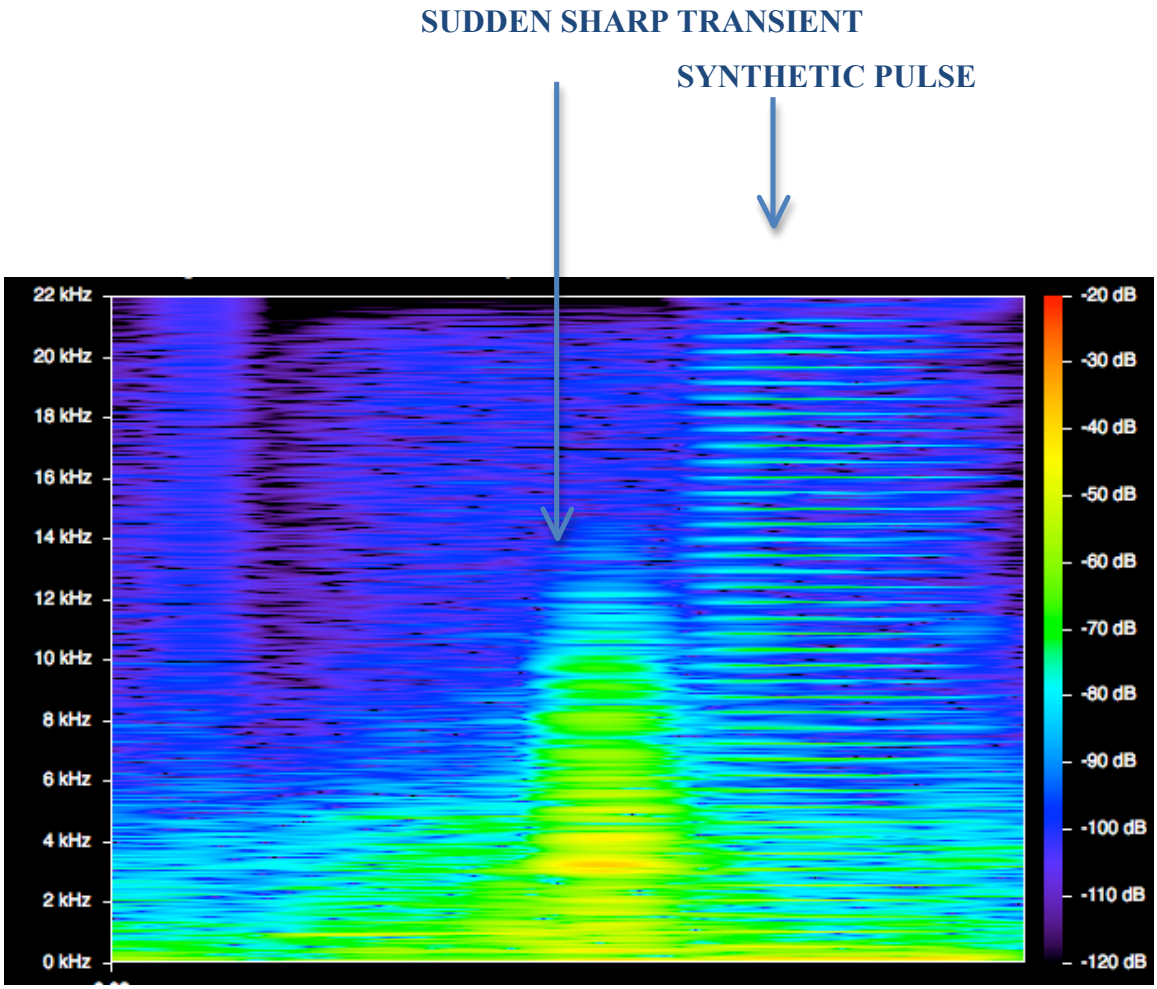


Figure 2-B-2 (1:47.850-1:48.110) (notice the mixture of the sharp transient leading to the synthetic pulse) with sound excerpt A.10

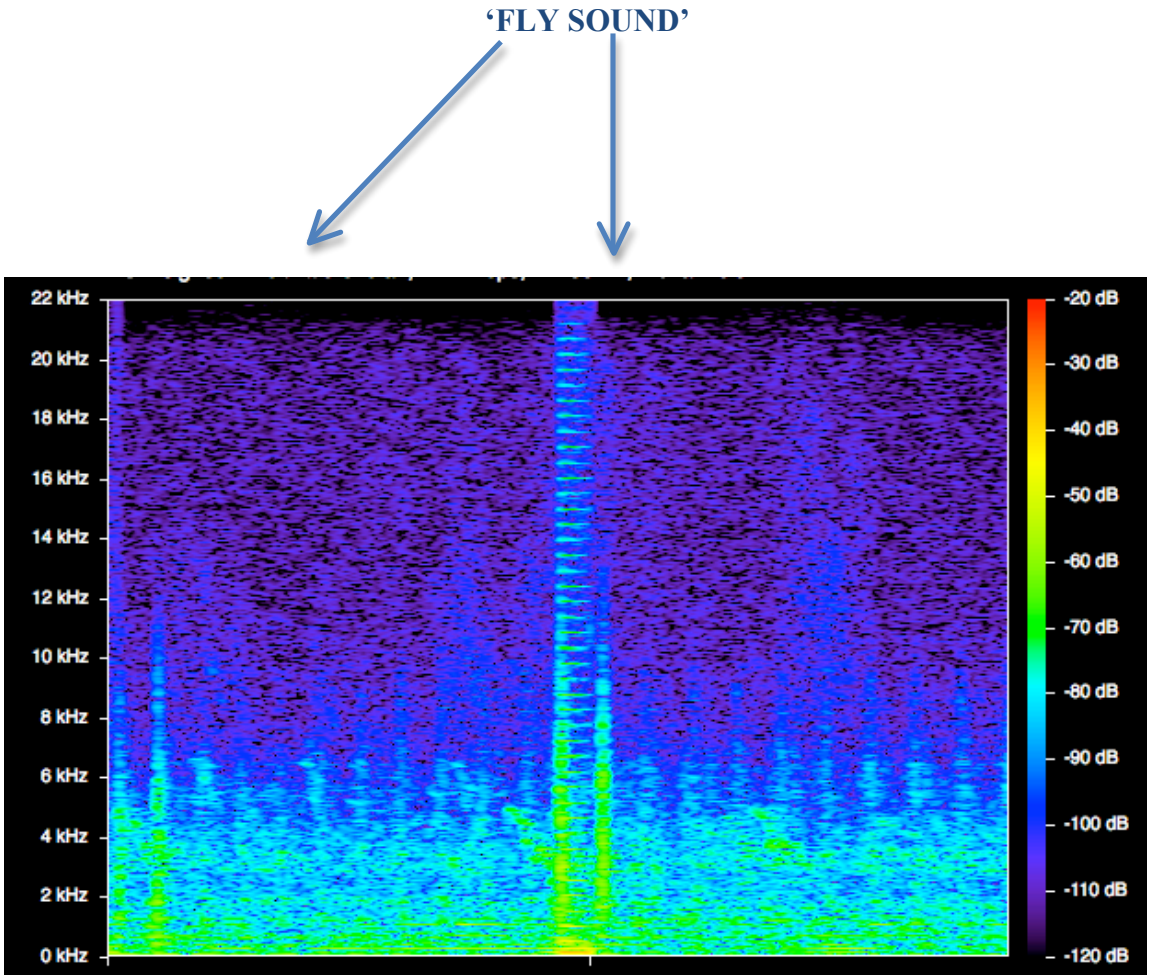


Figure 2-B-3 (1:57.40 -1:57.58) (notice the sound of a fly surrounded by the synthetic pulse in the middle) with sound excerpt A.11

Movement 2 - Part C

Main elements of Part C

1. Highly atmospheric part (cinema for the ears).
2. Transition of new drone emerges and changes tonality (emphasizing minor chord)
3. Church bell motive comes in
4. Synthetic pulse, engine pulse, sustained engine sounds all stay from Part B

Movement 2 - Part C (2:25-3:51**)**

A new drone in Part C emerges emphasizing an eerie atmosphere. There is a feeling of culmination and also a transition to a new tonality or drone. The synthetic pulses no longer fit harmonically as they did previously. The new drone is centered on 73Hz. Thus it shifts to a D tonality. Again, the drone is constantly moving and hard to recognize in the midst of all the texture. It becomes clear in 3:00. At the same point the church bell melody comes in. This is a very dramatic moment. It is also the first moment that uses a relatively clear melodic contour that lasts more than a single pulse (Part 3, takes the idea of melody a step further).

The sounds of dogs barking in 3:47 have a haunting quality to them (Figure 2-C-1). Sound excerpt A.12 belongs to this figure. It is no coincidence that Ferrari intersects them in a change to a new tonality that is in essence minor. There is a sense of astonishing imagery and narrative. The individual sounds gather expressive momentum. They become bits of images evoking a dramatic narrative through sound.

After looking closely in the Spear program and applying band pass filters there is a strong correlation between the new D drone which fluctuates sometimes to C# and the bell melody which uses C# and E (around 1100 and 1300Khz). Because of the harmonics of the church bells it is hard to determine an exact pitch but they clearly function like a melody

above the new drone. The choice of church bells is somewhat symbolic and again reinforces further imagery and new scale and dimension to the music.

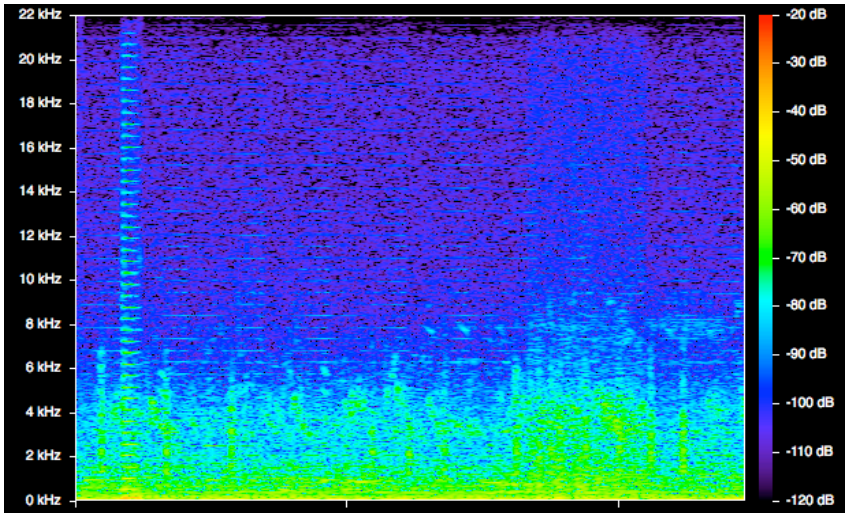


Figure 2-C-1 (3:47.51 - 3:50.13**)** (notice a synthetic pulse in the left a 'bird' pulse in the right and in the middle sounds of dogs barking appearing from far) with sound excerpt A.12

Movement 2 - Part D

Main elements of Part D

1. Transformation to minor tonality
2. French horn sustained note
3. Church bell melodic loop
4. Introduction of speech
5. Feedback elements
6. Easing from the previous tension
7. Synthetic pulse and additional pulses keep appearing like idee fixe

Movement 2 - Part D (3:51-6:09)

In Part D there is a general release of tension. It has an introspective atmosphere, which is melancholic yet calm. The transformation to the minor tonality is clear. The relationship between the French horn sustained sound and the drone is of a minor third. This is somewhat similar in concept to the first movement where the frequency 526Khz was related at times to the drone by a major third. Thus, it seems that the function of the French horn is derived from Movements 1 Parts A and B. Once again Ferrari plants seeds in previous section and than works in a compositional form of addition, adding new elements while retaining other motives and varying them in the micro scale. Below we can see the French Horn sounding on F4 (352 Hz) while the church bell melody appears around two octaves higher around C#6 and F6 (Figure 2-D-1). Sound excerpt A.13 belongs to this figure. It is important to note that there are many microtones in the piece. Nevertheless, it seems that their use is somewhat intuitive.

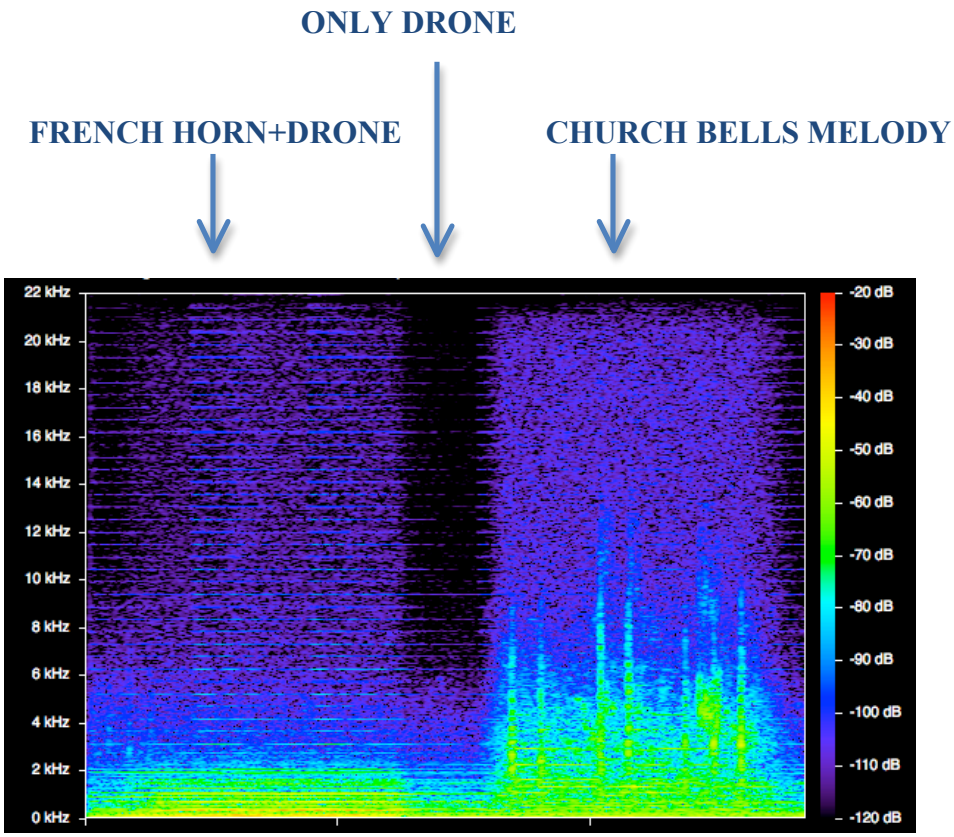


Figure 2-D-1 (4:20.55 - 4:23.41) (notice the sudden empty space and its effectiveness by using the drone by itself before imposing the church bell melody) with sound excerpt A.13

One of the impressive elements of this section is the way the French horn is integrated in the piece. One may barely notice that there is a French horn all of a sudden in the piece. The French horn with the bells has an almost symphonic element. It is an extremely unusual and imaginative inclusion. Another notable element is in 4:50. The long sounds seem to have a subtle amount of tape echo feedback, or some kind of feedback, although it is very hard to tell. In any case, the section as a whole evokes a sense of synesthesia, as the timbre component of the whole section is so emphasized as one whole unit. The transition for Part E happens with a field recording where we hear drops of water. It starts slow and eventually gets louder (5:43).

Movement 2 - Part E

Main elements of Movement 2 Part E

1. Sounds of people talking. As if a city is awakening
2. Voices of children and mixed languages
3. French horn motive and church bell stay
4. Pulse engines, synthetic engines, prolonged arrhythmic sounds stay
5. Drone is gone

Movement 2 - Part E (6:09-7:16)

Part E is an essence a transition to Part F. All of a sudden the listener is surrounded by voices and speech. We react so strongly to speech that the listener is forced to enter into a new listening dimension unguarded. There is something almost theatrical and yet disturbing about this part as the listener arrives to this section after a long period of relaxation that used mostly melodic elements. Without much warning, the listener hears multiple voices mixed in an artificial way as Ferrari creates once again an imaginary space of multiple languages, children, grownups, engines and drops of rain…Coming from Part D to E has a contrast of an inner world against an unquiet outside world. There is an irritating, distressing quality about E that is about to get more uncomfortable in Part F. As if a protagonist has no choice but to face an overwhelming range of voices against his own will.

Figure 2-E-1 shows the beginning of section. Sound excerpt A.14 belongs to this figure. There are two separate short pulse events here: speech, synthetic pulse, engine pulse and finally a cough as an attack that leads directly to the French horn note F4 (352Khz).

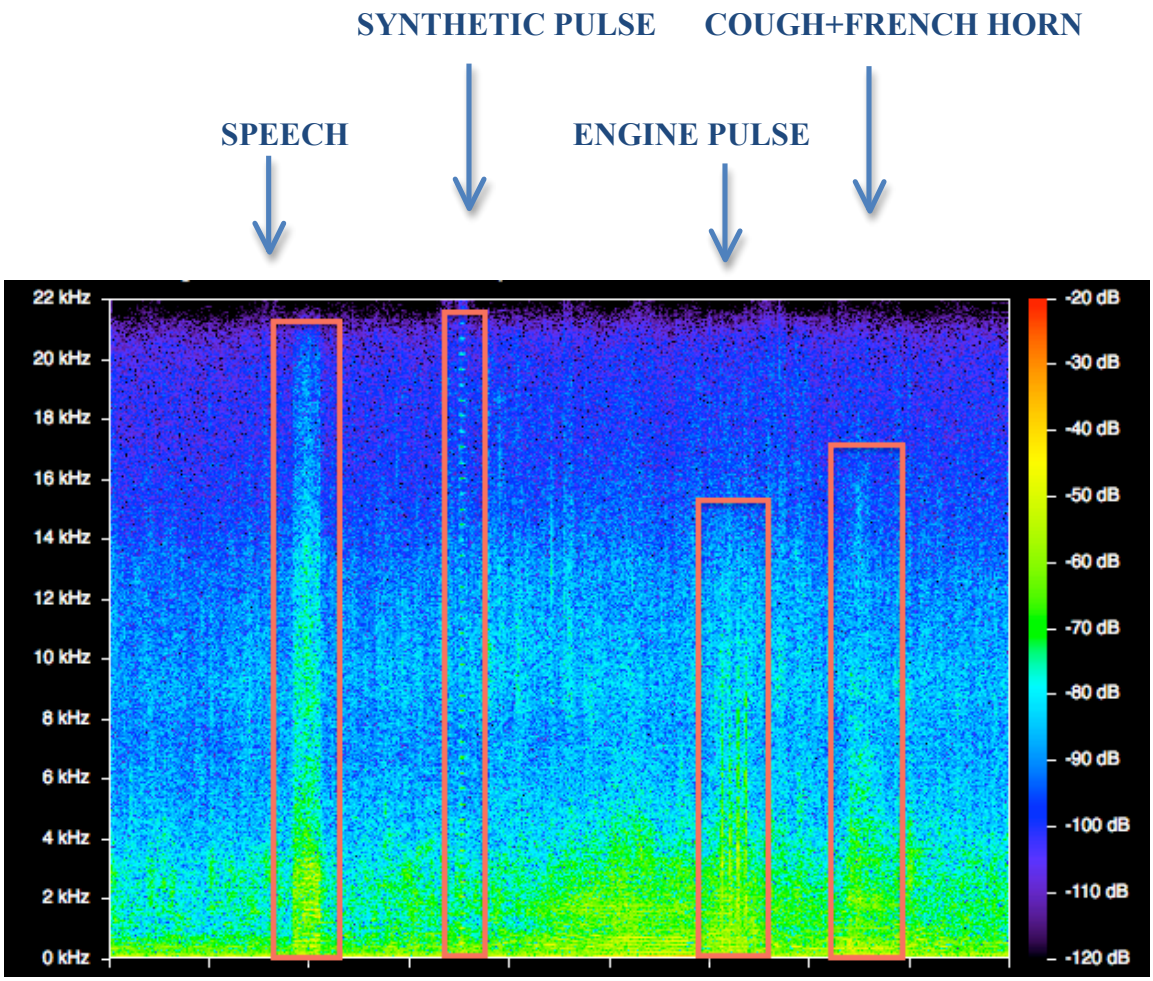


Figure 2-C-1 (6:09.310 - 6:18.610**)** (notice the white noise of water surrounding sudden transients. The synthetic pulse and engine pulse have stronger hierarchical value) with sound excerpt A.14

Movement 2 - Part F

1. Mixture of both tonalities so far
2. Grotesque gestures with animal sounds
3. Pulses of speech
4. Gestures of fast envelope attacks
5. Very loud attacks of volume
6. Motive from Track 1 – Part A

Movement 2 - Part F (7:16-8:07)

Part F has perhaps the most unsettling quality in the piece so far. It is a feeling of general confusion instability and unrest. Gestures from Part 1 – A all of a sudden come back again and the idee fixe of the synthetic pulse. It is unsettling in its quality because its purposefully not homogenous to the acoustic texture but even more than that its almost harassing quality lives the listener bewildered, preoccupied with its meaning. The synthetic pulse is enigmatic. On one hand its concrete and on the other it becomes symbolic and surrealistic.

Transients of voices become integral in the whole texture. For example consider the sudden loud vowels that appear at 7:23 (u), at 7:27 (i) or at 7:48 (a) by a child who shouts.

Asides from that, sounds become extremely loud in unpredictable erratic places. There are also noises that are unattractively loud. The sudden shifts of volume that appear in this section operate in an arrhythmic way. They correlate to the title and the conceptual element in the piece.

Another point of tension happens when both drone elements from movements one and two sound simultaneously. For example the motive of the French horn, which is immediately followed by the church bells appears while the sustained frequency from chapter 1 Part A appears (526Khz). This creates tension and distress since both tonalities

clash into one another. The sudden grotesque sounds of animals in 7:58 and 8:00 are also provocative and unsettling.

In the words of David Grubbs who visited Ferrari at the same period that Ferrari was treated for Cardiac Arrythmia: “I can’t think of any of Luc’s other works that are stamped by dread in the same manner as *Les Arythmiques.* Luc’s characteristic humor is here, particularly in the superimposition of diverse sound environments. But Les Arythmiques also possesses a nagging unease, a persistent gravity that both listener and composer cannot shake”. Les Arythmiques is not an easy piece to digest, even more so in chapters 6 and 7 where the waveforms purposefully pass their amplitude limit and where the ‘nagging unease’ that Grubbs refers to becomes agonizing. And yet ‘Les Arythmiques’ unease is full of inventiveness, expressivity and imagination.

Like Ferrari suggests in the liner notes of the CD, Les Arythmiques has programmatic elements that are purely dramatic. It is hard to treat the piece as a purely abstract piece. The piece borders between magic realism, surrealism and realism. Unlike many of Ferrari’s pieces, there is no lightness in the piece and as Grubbs suggests it is hard to find humor in it. It deals with a personal struggle and reconciliation in its last movement and it embodies the humanistic approach that Ferarri cared so much for. In the spirit of Jean Debuffet, Les Arythmiques is extremely personal and all too human.

Part 2

Brief Analysis of the Author's Compositions

2.1 “24 Shrinking Miniatures”

The piece is divided into 6 parts. Each part has 4 pieces that last for around the same amount of time. In Part 1 every piece lasts around 45 seconds, Part 2 35 seconds, Part 3 25 seconds, Part 4 15 seconds, Part 5 5 seconds and Part 6 1 seconds. From piece to piece I allow myself to move freely between tempos. Nevertheless the compositional game is to try to make pieces make sense in terms of form even when the parts are getting shorter. This was a compositional challenge to try to make musical sense as the format becomes shorter. I decided on this time structure before the I began writing the piece. This is a different method of working than other pieces presented in this chapter. In every part I try to make bookends between A and D. Usually B and C are free. Between every miniature there is a pause. The logical progression is the time that gets shorter by increments of 10 seconds except in the last part (increment of 4 seconds). Needless to say when I got to miniatures of 5 seconds it became almost impossible to create a real structure with beginning middle and end. It is precisely this struggle, which gave the piece more depth as if someone is going against time and trying to achieve more as time is shrinking and there are less possibilities offered…

The piece gave me a lot of freedom to experiment with simultaneous rhythms that would have been almost impossible to play by a pianist because of the speeds and register jumps. I used an intuitive approach, algorithmic approach (notes derived from code by Python using Cellular Automata), Fibonacci numbers, but above all I used Sibelius as a composing tool. The compositional plug-ins in Sibelius were heavily used in this piece. I have been using this approach for many years at this point. This form of composing has some advantages and can be used like an instrument. Sibelius is a commercial tool but nevertheless it can be used in a very quick way to do certain things that would be impossible to do with pencil and paper at such speed. It would be impractical and time consuming for no real reason to compose a piece like this with pencil and paper and I wouldn’t have got the same result.

Some tools that I use with the software and that are heavily used in this piece are the following: transposition, retrograde, double time or half time of notes, pitch re-mapping, inversion, randomization of pitches and more. In this method of composing I put heavy emphasis on editing. The act of listening over and over and editing is crucial. I have also

written a lot of material that did not make it into the piece. Listening and revising is what I do in this method more than pieces that have a different intention.

Here is an overview of the piece:

Part 1, 45 seconds each miniature:
A B C **D** (A and D act as bookends via pitch mapping plug in)

Part 2, 35 seconds each miniature:
A B C D (There are no bookends in this part)

Part 3, 25 seconds each miniature:
A B C **D** (A and D act as bookends via pitch mapping plug in)

Part 4, 15 seconds each miniature:
A B C **D** (A and D act as bookends via Fibonacci melody with retrograde)

Part 5, 5 seconds each miniature:
A B C **D** (A and D act as bookends via crescendo decrescendo)

Part 6, 1 seconds each miniature:
A B C **D** (A and D act as bookends via staccato)

Part 1 (45 seconds each)

Part A and D act as bookends. Here I used the Pitch Mapping tool from Sibelius. The way I create Part 1D is by taking Part 1A and using this plug in and turning it from atonal to tonal. This creates a strong effect because it tangles with the listeners' perception and has an almost humorous effect. Part 1A was written completely intuitively. I created Part 1D by taking Part 1A and mapping 12 pitches to about 8 pitches. The overall idea is that the atonal material turns to tonal all of a sudden in the concluding movement in an inexplicable way. The rhythms that were created intuitively are retained. Part 1D reminds of Debussy but the irony is that it was created by a plug-in.

I wanted this piece to have melodic material that belongs almost to folk or a pop genre. So that the combination would be between: atonal/polyrythmic/tonal and melodic/tonal via algorithms/purely algorithmic/extremely gestural. Therefore I decided to have a melodic approach in certain parts. This is a purposely very canned approach of composition where I wrote the melody first and later added the chords. Part 1C is an old pop song that I wrote as a teenager. I took the melody of the song and used it and later added chords (Bar 80). Figure 3-1A-1 shows this part.

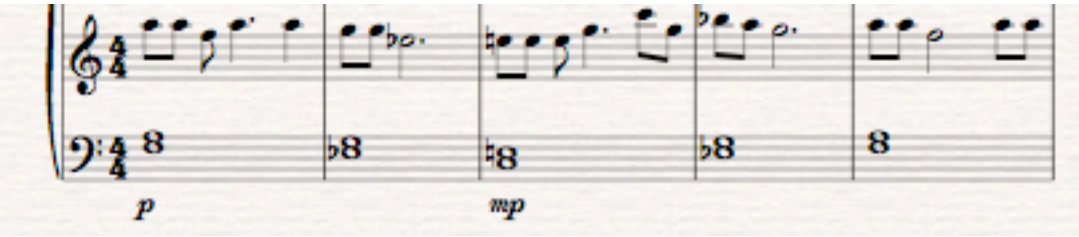


Figure 3-1A-1

Part 2 (35 seconds each)

In this part there are no bookends, nevertheless, Part 2D feels conclusive. In Part 2A The bars were first written with their corresponding meters. The main idea in this miniature is that there's interplay of expansion and contraction of duration between two chords in different register (one in a high register and one in the bass). The high register chord has the following progression of duration: 2/8, 3/8, 4/8, 7/16, 6/16, 5/16, 4/16, 3/16, 2/16, 1/16, 1/32. Thus this high register expands and contracts a point where it's shorter in value then its starting point (2/8 compared to 1/32). Furthermore it's ending duration (1/32) is the same as the duration of the beginning duration of the low register chord (1/32). Thus this miniature's story is perhaps of two characters trading places.

The low register chord has the following progression: 1/32, 1/16, 2/16, 3/16, 1/4, 3/8, 2/4, 5/8, 4/8. Thus it expands in duration and in the end it briefly contracts. To avoid a strictly formal approach I added another layer of figuration in this movement (this can be seen in bar 174 for example where there are melodic lines in conjunction with both chord registers). In the future I plan to continue working more with this technique of prolonging and expanding registers made out of chords while filling material in between. Figure 3-1A-2 shows this part (Bar 143).

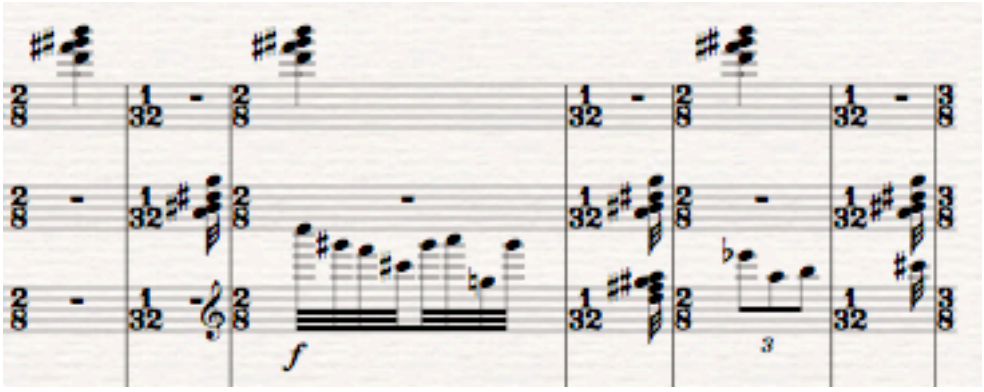


Figure 3-1A-2

Part 2C uses Cellular Automata material that I created via Python and the Abjad notation library. This program was created with the provision of computer music pioneer and the Corwin Chair of UC Santa Barbara, Professor Clarence Barlow. I only had the idea to map

Cellular Automata to pitches. However, the issue was how to map them in an effective way. Professor Barlow came with the following idea: since there are eight states, each state will be mapped to a different scale or mode pitch. This fit very well to a musical context. With the extremely dedicated guidance of Barlow I ended up creating many tests with Cellular Automata. Barlow also suggested creating a Python program to determine which Cellular Automata rules would be most interesting. After creating another program to determine this I gained more control over the musicality of the Cellular Automata rules.

I also came to a conclusion that I would like to add a few manual touches to the composition and this is precisely how Part 2C was composed. I created an introduction that leads to the Cellular Automata part. The introduction uses transposition heavily as it manipulates fast gestural figurations. The Cellular Automata starts at Bar 250 and uses various fast manual interruptions by interjecting material from the beginning of the miniature. In figure 3-1A-3 the 7/32 is intuitive material and in bar 250 the cellular automata begins (this is material that is strictly derived from using Python and Abjad).

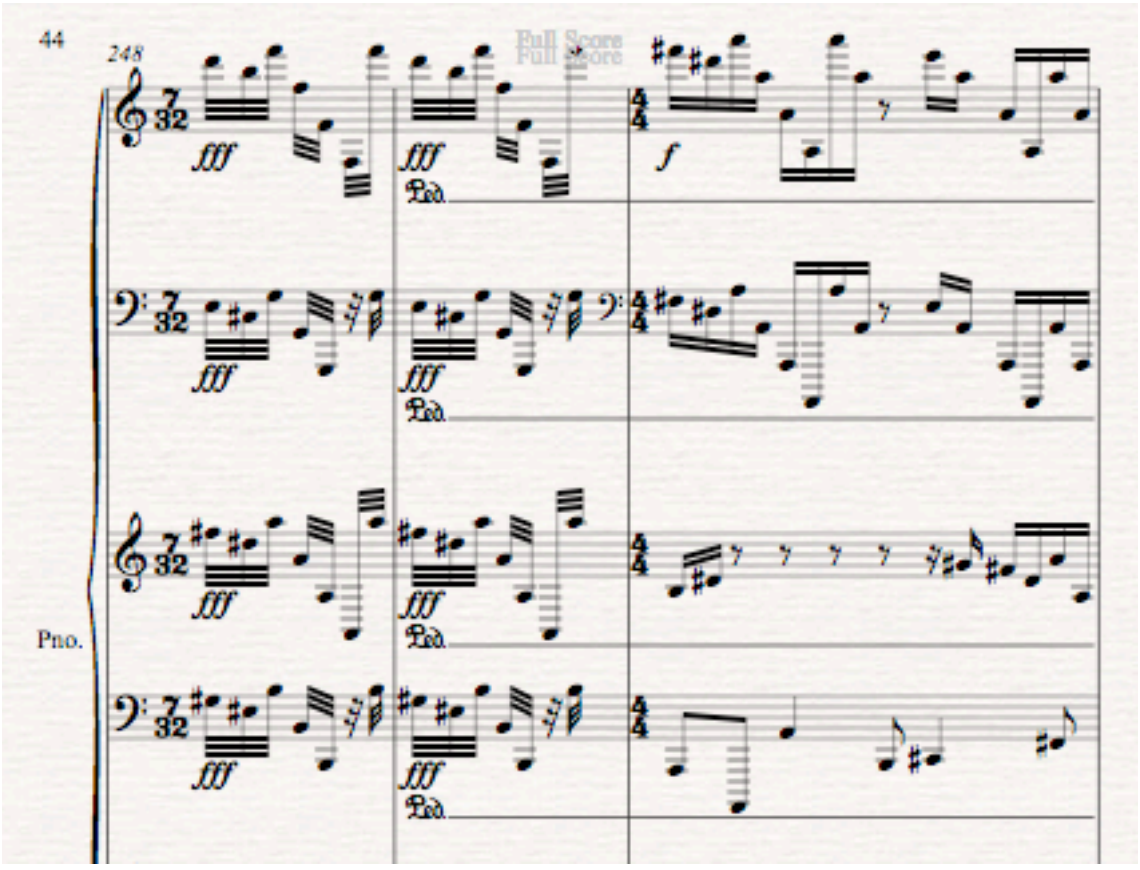


Figure 3-1A-3

Part 3 (25 seconds each)

Part 3A and part 3D function as bookends. Again material from 3A is taken to 3D and the pitch mapping plug-in is applied to create tonality from 3A, which is atonal. The tonality of 3D is A major. Part 3C is again melodic like 1C. First the melody was written and than chords added. However, there are figurations and other compositional styles in Part 3C (this is likewise in Part 1C). Figure 3-1A-4 shows this part (bar 353)

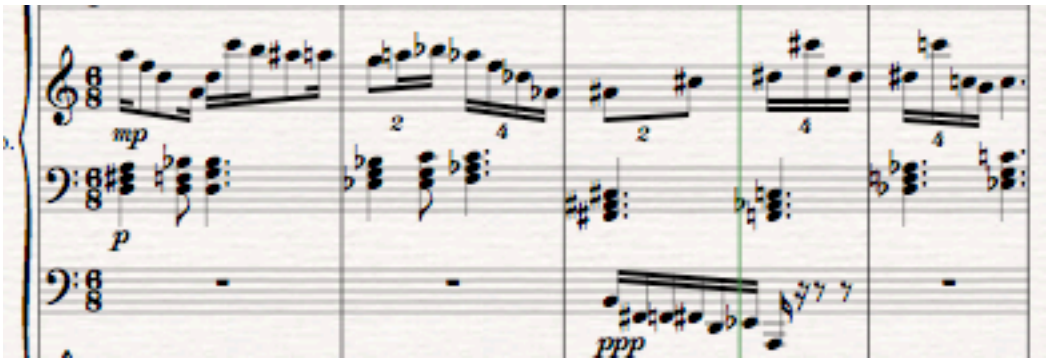


Figure 3-1A-4

Part 4 (15 seconds each)

Part 4A and 4D act like bookends. This time the pitch-mapping algorithm is not applied instead I used the Fibonacci series to create a melody. The way this works is that every time a new number in the sequence is reached the melody restarts from it's initial point. Below is an example of how I use this technique with an arbitrary melody (I will use solfege syllables to explain this technique).

Original Melody:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Do	mi	re	so	fa	la	so	mi	so	mi	so	do	mi	do	mi	fa	fi	so	mi	re	mi

Fibonacci numbers applied so that the melody becomes the following:

1

Do

1 2

Do mi

1 2 3

Do mi re

1 2 3 4 5

Do mi re so fa

1 2 3 4 5 6 7 8

Do mi re so fa la so mi

1 2 3 4 5 6 7 8 9 10 11 12 13

Do mi re so fa la so mi so mi so do mi

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21

Do mi re so fa la so mi so mi so do mi do mi fa fi so mi re mi

Final melody becomes:

Do Do mi Do mi re Do mi re so fa Do mi re so fa la so mi Do mi re so fa la so mi so mi so do mi Do mi re so fa la so mi so mi so do mi do mi fa fi so mi re mi

In retrograde this melody becomes:

Mi re mi so fi fa mi do mi do so mi so mi so la fa so re mi do mi do so mi so mi so la fa so re mi do mi so la fa so re mi do fa so re mi do re mi do mi do do

This idea can be expanded to any algebraic sequences or series. What I find interesting in this method is the expectation created by the Fibonacci numbers every time a new set of material is revealed. I am also interested in the sudden accents that are caused when the material restarts. 4A and 4D use this technique on a pre-existing melody that I chose. 4A takes the retrograde (thus shrinks) and 4D expands since it goes linearly. Both reach until the 89th number (the 12th number in the series if zero is included). Figure 3-1A-5 shows this part in the piece (Bar 436).

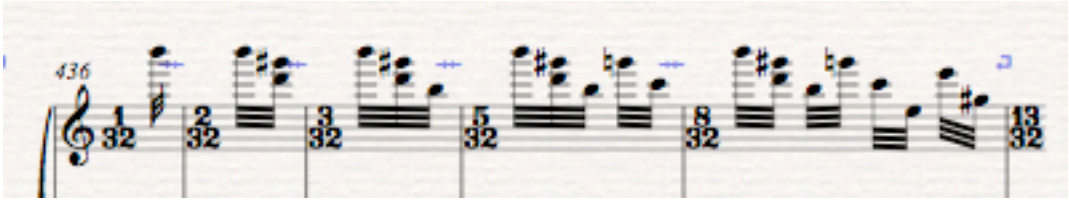


Figure 3-1A-5

In my pieces Fibonacci Memory 1 & 2, I use this technique but apply it to bars instead of melody and this generates the form of both pieces. In my electronic piece "Homage to Phantom of Liberty by Bunuel" I apply the same technique on audio as a form of delays.

Part 5 (5 seconds each)

Because of time restraints of very short miniatures, each piece has less of a beginning and an end. I try to compensate by making very clear bookends between 5A and 5D. Part 5A goes from f to ppppp while Part 5D goes from ppppp to ff. Both parts are sustained chords with trills. Also 5D uses a relatively more tonal chord than 5A. This was done with the pitch map plug in.

Part 6 (1 seconds each)

Part 6A and D are similar in their use of staccato.

2.2 “Marco at the Record Store”

The piece is divided into three movements:
I. Marco Contemplates Going to the Record Store
II. Marco Enters the Record Store
III. Marco Listens to the Record and Decides to Buy it

Although the piece has some humorous implications, it is also a homage to a different era, where record stores were the form of browsing music. Growing up and collecting records and CD’s influenced me to write the piece. Thus, the piece is somewhat light and anecdotal. The piece uses electronics and field recordings of a record store. It also uses synth parts derived from the score and other effects. Therefore there’s a documentary layer, a sound design layer and doubling of the acoustic instruments with synths. For the synths I used a Roland TB-03 and the Korg Minilogue.
The piece uses Markov chains to derive the third movement. First, the third movement was written, then the second and finally the first. The third movement is derived out of Markov Chain code written in Python. After generating the code I orchestrate it to a quartet.
The second movement uses the Markov Chain as a starting point. I wrote the second movement in the following way: on a piano stave in Sibelius I had all the Markov Chain part than I started borrowing intuitively parts from the Markov Chain and re-using it in different ways. There are hints of Rondo a la Turka in the second movement but it’s mostly hidden. This movement is completely intuitive as it borrows fragments from the Markov Chains and uses editing techniques, varied signature marks, transposition, retrogrades and so on.

<u>The First Movement</u>

For the first movement, which I created last I made 20 different parts that get shorter in seconds. The parts had the following amounts of seconds: 20, 19, 18, 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1. With a computer program I used the randomization algorithm

and chose different bars from the seconds movement. Once I chose a few bars I created a sequence of seconds (I started with 20 seconds and proceeded). I also decided that each part have its own transposition (for example when I reached the 14 second piece I decided that it would use a perfect 4th). Also I decided to make five different groups with five different tempos. Last I decided that some pieces will have a certain amount of silences.

To conclude, the algorithm for chapter one looks roughly like this:

Piece No. 1 – Duration 20 Seconds – transposition of a P4 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 3 silences

Piece No. 2 – Duration 19 Seconds – transposition of a m3 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 3 silences

Piece No. 3 – Duration 18 Seconds – transposition of a M3 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 3 silences

Piece No. 4 – Duration 17 Seconds – transposition of a P5 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 3 silences

Piece No. 5 – Duration 16 Seconds – transposition of a M2 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 3 silences

Piece No. 6 – Duration 15 Seconds – transposition of a m2 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 2 silences

Piece No. 7 – Duration 14 Seconds – transposition of a P4 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 2 silences

Piece No. 8 – Duration 13 Seconds – transposition of a m3 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 2 silences

Piece No. 9 – Duration 12 Seconds – transposition of a M6 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 2 silences

Piece No. 10 – Duration 11 Seconds – transposition of a M2 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 2 silences

Piece No. 11 – Duration 10 Seconds – transposition of a m6 – material derived from random bars from Chapter 2 – Metronome is quarter equals 80 – 3 silences

Piece No. 12 – Duration 9 Seconds – transposition of a P5 – material derived from random bars from Chapter 2 – Metronome is quarter equals 80 – 3 silences

Piece No. 13 – Duration 8 Seconds – transposition of a P4 – material derived from random bars from Chapter 2 – Metronome is quarter equals 80 – 3 silences

Piece No. 14 – Duration 7 Seconds – transposition of a P5 – material derived from random bars from Chapter 2 – Metronome is quarter equals 80 – 3 silences

Piece No. 15 – Duration 6 Seconds – transposition of a m6 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 3 silences

Piece No. 16 – Duration 5 Seconds – transposition of a P4 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 1 silences

Piece No. 17 – Duration 4 Seconds – transposition of a m6 – material derived from random bars from Chapter 2 – Metronome is quarter equals 60 – 1 silences

Piece No. 18 – Duration 3 Seconds – transposition of a m3 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 1 silences

Piece No. 19 – Duration 2 Seconds – transposition of a M3 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 1 silences

Piece No. 20 – Duration 1 Second – transposition of a P5 – material derived from random bars from Chapter 2 – Metronome is quarter equals 40 – 1 silences

The silences mean that there are points in the pieces where there are pauses. Between each movement I added a piano chord. Later I added all the pieces together but was not satisfied and added only the pieces that I was happier with the most. However, I made sure that the pieces shrink in their timings. For example: 20, 17 , 15 , 13 , 11, 9, 7 , 5, 4, 3, 2, 1
The shrinking of the pieces with the accentuation of the piano chord worked well in terms of form and created expectation towards the second movement.

Figure 3-1A-6 shows all the 20 files that were done in Sibelius and Figure 3-1A-7 shows file no. 1 which has one three silences and lasts 20 seconds

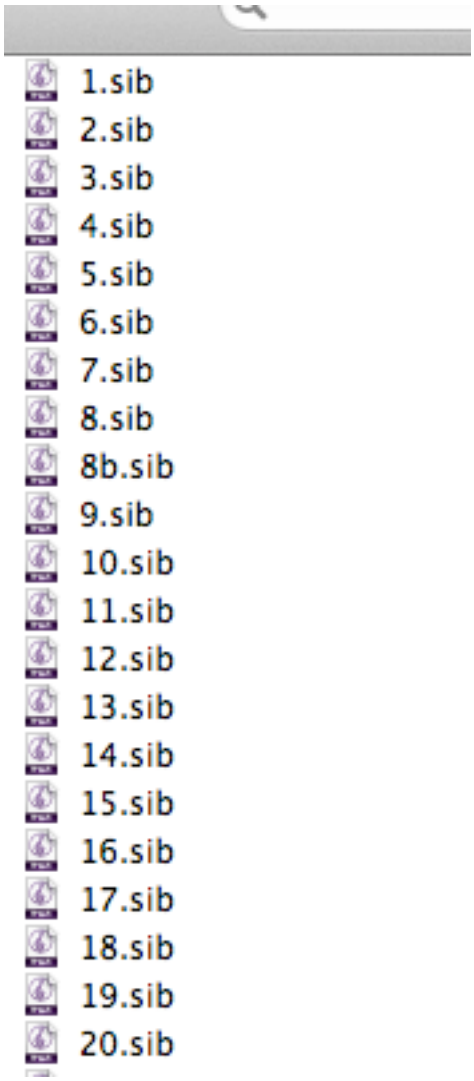


Figure 3-1A-6

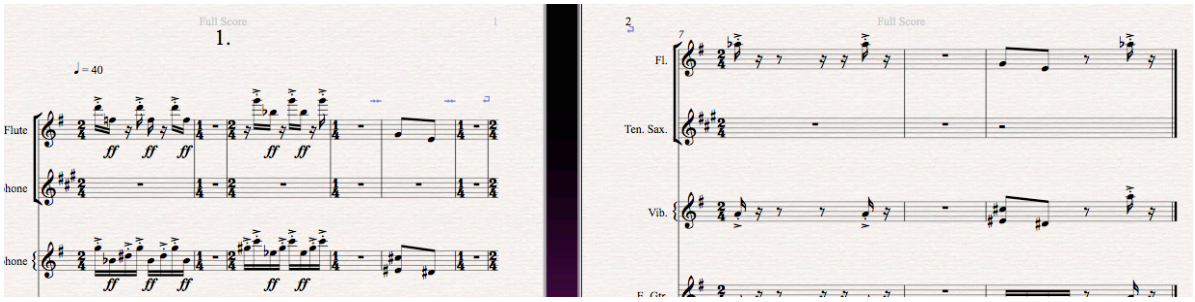


Figure 3-1A-7 (this figure shows file no. 1 which has 3 silences and lasts 20 seconds)

2.3 “Small Town”

In this piece I made a conscious decision to work in a completely different way than pieces such as “24 Shrinking Miniatures” or “Marco at the Record Store”. The piece is almost an antithesis to the aesthetic of “24 Shrinking Miniatures”, however the Fibonacci series is used in two pieces like “24 Shrinking Miniatures”. In “Small Town”, the main idea was to write the music at the piano and use pencil and paper. Also the piece relies quite a lot on improvisation at the piano. Thus, the way this piece was composed was to try various gestures at the piano and than basically capture them. The aim was to create a piano piece that pays special attention to the timbre of the piano. Although the notation is traditional, the piece is meant to be played in a freely manner without a strict metronomic time. Pedal is heavily used throughout the piece as a kind of natural reverb. The piece was influenced from childhood scenes in the Small Town, which I grew up. It has an autobiographical element and aesthetically it interplays with the genre of piano music for children. Using this genre was a conscious decision. The piece lasts 48 minutes.

The piece has six movements:

I. Staircases
II. Mirror I
III. Fibonacci Memory I
IV. Mirror II
V. Fibonacci Memory II
VI. Felipe and the Cat

<u>Staircases</u>

Staircase uses a technique of fragmentation. I composed various small pieces and than added them together. This piece is mainly intuitive.

Mirror I and Mirror II

Mirror I and II use a technique that I came up with, which constitutes of a few simple rules:

1. Pedal is always pressed
2. The left hand and right hand are generally close to each other
3. Almost always eighth notes are played simultaneously in the left and right hand (this is basically like first species counterpoint-note against note).
4. Usually the notes are in contrary motion and since they start in close proximity they make what seems like a mirror image.
5. The mirror image is never completely exact (some intervals are the same in contrary motion and some are not)
6. The music is almost always continuous from beginning to end without cadences
7. Meters change a lot creating an unpredicted pulse
8. At times the left hand and right hand have different groups of notes. For example from measure 48 to measure 53 in Mirror II, the left hand starts all of a sudden to have group of 5 rather than six and later on measure 53 both hands have groups of 4 notes (Figure 3-1A-8). The same idea can also be seen in measures 97 to 101 (Figure 3-1A-9).

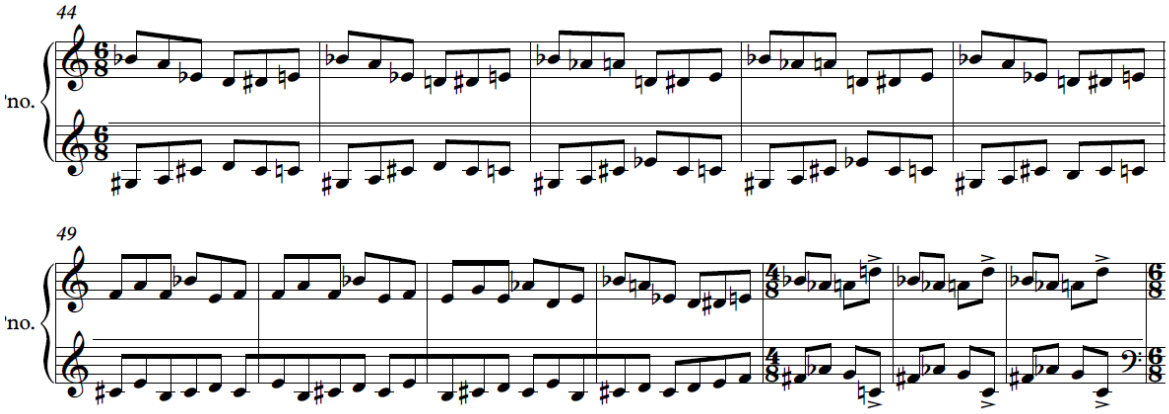


Figure 3-1A-8

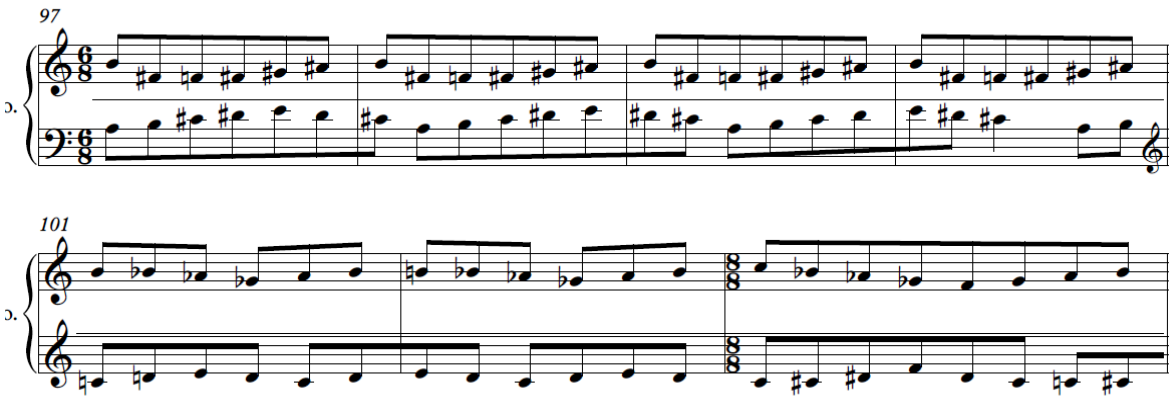


Figure 3-1A-9

Although this is a ‘manual’ piece and does not use a programming language to create it, the decision of a loose algorithm was influenced and inspired by Professor Barlow’s teachings about the use of algorithms in composition.

In Mirror I thought about the fragments and groupings as loops and one of the things that happens is the addition of elements to a group. This creates unpredictability on when the loop will be changed. However, the notes themselves are always using eighth notes so there is a sharp contrast between uniformity and unpredictability. For example on measure 29 to 40 in Mirror II, there is an example of unpredictability. Measures 30 and 31 are almost identical except to measure 32 and 33 except that measure 33 is 5/8 instead of 4/8 and adds another 8th note that is a half step higher in the treble and a whole step lower in the bass. Measure 34 is a 2/8, and 35 and 36 are identical to 37 and 38. Again the unpredictability is that 34 is autonomous and this creates a feeling of not knowing when things are going to repeat or not. This can be seen in Figure 3-1A-10.

There is also interplay between melody and harmony. Because the pedal is pressed it blurs the border between melody and harmony. Theoretically, this composition could have been coded in a programming language; nevertheless I would argue that it would have missed the actual experience and nuances of listening and playing.

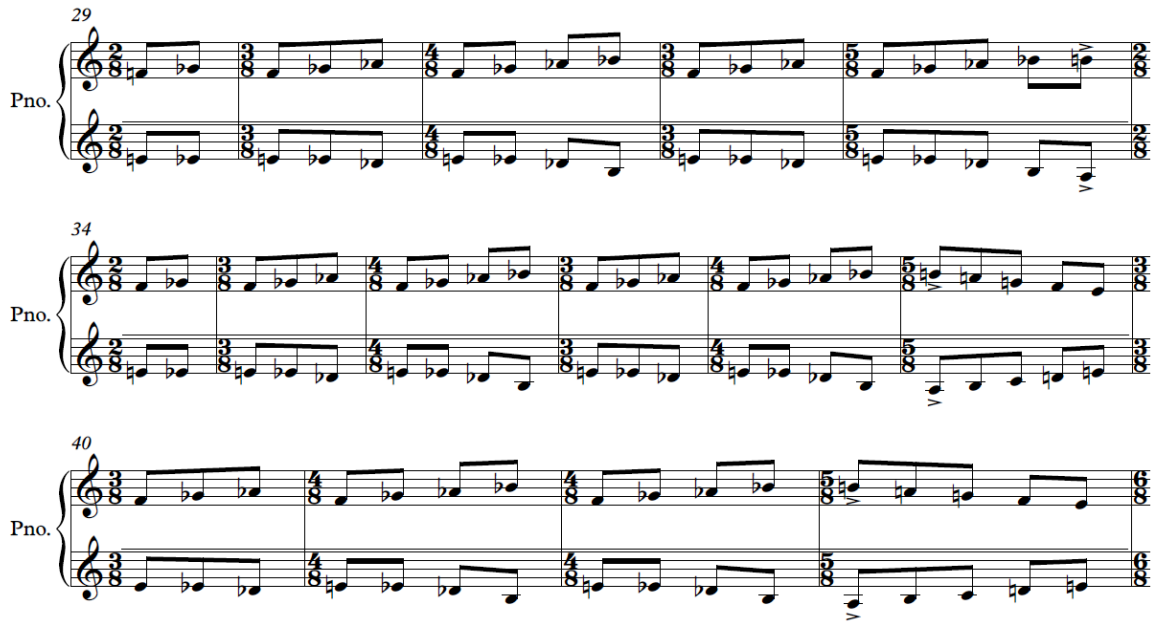


Figure 3-1A-10

Fibonacci Memory I and II

These two pieces were written in the following way. First I wrote a piece in an intuitive manner then I applied the Fibonacci series on bars as opposed to notes. This is very similar to the technique used in “24 Shrinking Miniatures” (4A and 4D). However, this time it is applied on bars. As a result the piece expands every time a new set of numbers is revealed (for example 6,7,8 when we reach the 5 number in the series excluding 0). Fibonacci Memory is a metaphor to the act of remembering. Just like the repeated music is never the same so does our memory as it plays tricks on us. Fibonacci Memory II uses a slight variation on this technique: once the piece is arranged according to the Fibonacci series it is manually slightly rearranged again as it is abstracted and does not follow the exact algorithm. The result is very much like a painting where the work is done in layers, at first a

very uniform mold is done but later there is another layer on top of that which, is manual and by far more delicate.

Felipe and the Cat

Like Staircases this piece is completely intuitive. It lasts three minutes and borrows motives from Staircases.

2.4 “Trichromatic” and “Death of a Moon”

These two pieces were made using natural harmonics. The idea and inspiration to create them derives from Professor Clarence Barlow’s piece “Until” and performing it on guitar.

Trichromatic

Trichromatic was written for guitarist Seth Josel and than later recorded by him. The tuning of the piece is as follows from low string to high string: E, G#, D, F#, B, E. The influence from “Until” by Clarence Barlow, which I performed on electric guitar is evident in the score. Like “Until”, the piece uses alternate tunings in the guitar as well as a free rhythmic element determined by the guitarist.
Each stave system lasts from 10 to 25 seconds. The piece also uses brief field recording and also a loop pedal. At a certain point the loop pedal is used and the texture gets dense and polyphonic, this creates a dramatic effect and a point of contrast – this is the high point of the piece. After a few layers the pedal abruptly stops and the guitar plays again in a monophonic way until the end of the piece.
Although the lines are monophonic in the piece, I used a lot of adjacent strings. Usually every note is on a different string. Because of the amplification and the lingering of the overtones in the guitar, the piece’s sound is somewhat reminiscent to that of “Small Town” for piano, this creates an almost pedal like and polyphonic texture when sounds blend with

each other as they are constantly held and disappearing into one another. I was interested in a delicate and very transparent texture. The challenge for the player is the transparent nature of the piece. It is as if the player has to walk on a thin rope, paying constant attention to the texture, which aims for delicateness. The piece also uses many beating by playing the 'same' pitch with different harmonic partials. Trichromatic uses the following partials: 4,5,6,7,8 in all strings.

The piece was composed in the following manner: I calculated the numbers corresponding to the partials, created sine waves with the corresponding numbers, mapped the sine waves into a software named Battery. Battery uses a rectangle-like interface. I made a grid with vertical rows for the string numbers and horizontal rows for the partial numbers. The approach for the composition of the piece was mainly visual and also numerical. Every sample had the number of the frequency. I deliberately tried not to think about the names of notes and looked intuitively for interesting numerical relations. But perhaps more than that the composition game of this piece is by playing visual games and creating visual shapes that were appealing. Figure 3-1A-11 shows the grid in the Battery software, which I used to compose the piece. Once I had the environment for the piece I worked intuitively with the mouse as I pressed on frequencies that I liked and with a separate piece of paper I wrote the order of pitches.

Figure 3-1A-11

Figure 3-1A-12 represents the composition method of pressing on different frequencies according to a visual pattern. The numbers represent the order of notes in the first system of the piece. Figure 3-1A-13 show the translation of the frequencies to a clear notation on the guitar. When composing in this method I purposely do not want to know the pitch names that I am working with and only later I do the translation from frequencies to pitches. This method works particularly well for me when working with natural harmonics. The representation fits for the method.

Figure 3-1A-12

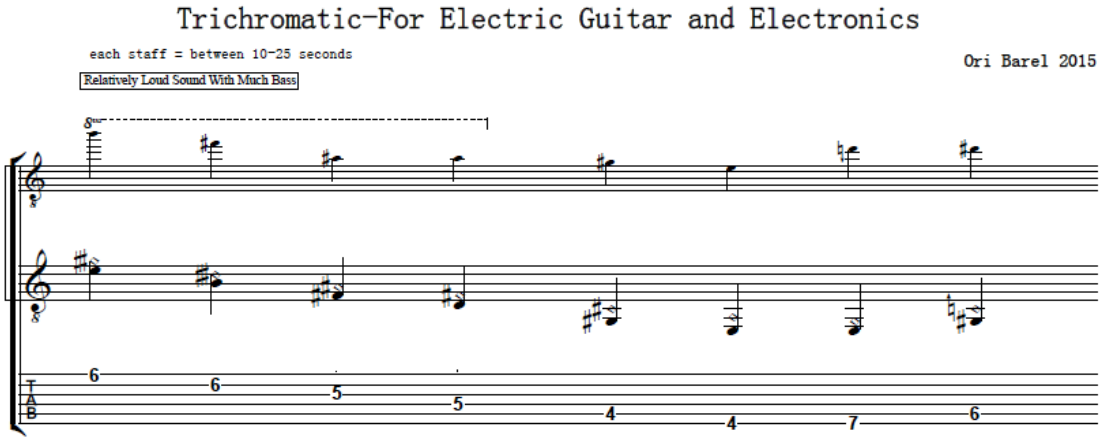


Figure 3-1A-13

Death of a Moon - Trichromatic

In this piece I used the same composition environment as Trichromatic. The piece uses the first 10 overtones of the contrabass in every string. The strings are not retuned. There are a total of 7 contrabasses overdubbed. The piece was written for contrabassist Eran Borovich and was recorded by him. It uses a very soft sound design in the background which includes voices of children, cars sounds, and occasional since waves. Like trichromatic I was deliberately trying to think more in terms of frequencies and I used again a visual approach. At first I created sine waves with the corresponding frequencies, later I recorded the contrabass playing all overtones and switched the samples. I used a combination of computer and paper while clicking on the different frequencies with the mouse and writing them down. Only later I determined the note length and rhythms of the piece. Nevertheless, unlike a piece like “24 Shrinking Miniatures” this is not a rhythmic piece. I was more interested in the piece having a vocal quality and following a natural rhythm as if someone is singing a simple tune. The piece tries to create a delicate, yet rich texture with the bass while using polyphony made with harmonics. Figure 3-1A-14 shows the composition environment of the piece. The composition environment of both pieces determined the result of the compositions. I made various pieces prior to this version but was not satisfied until I made the last version.

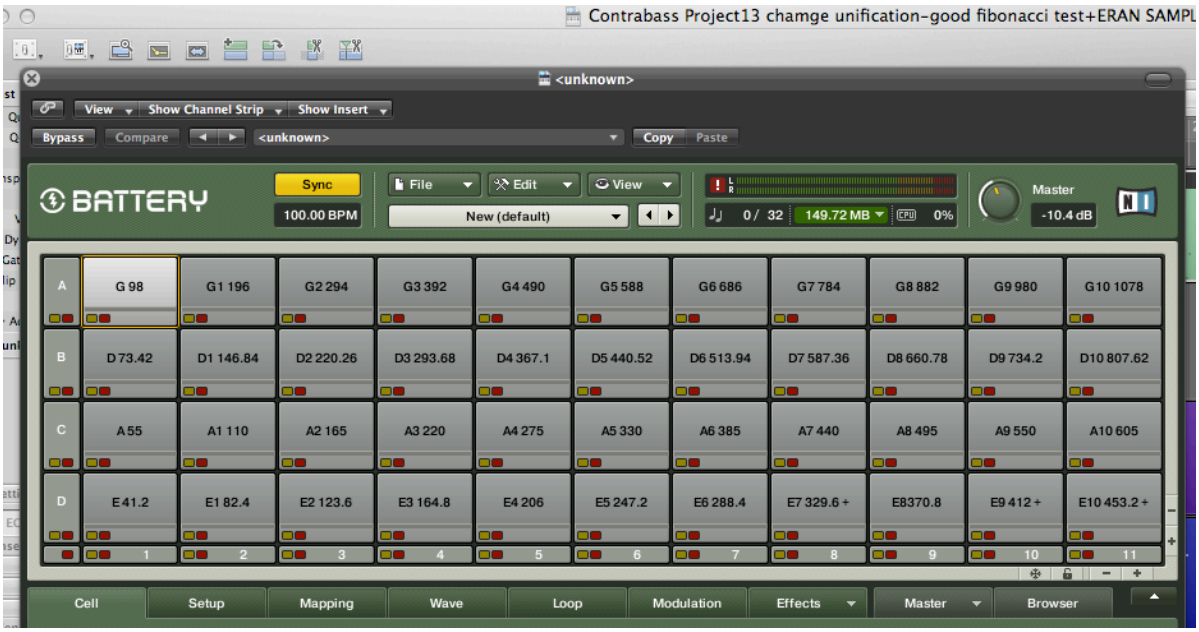


Figure 3-1A-14

2.5 “Homage to Phantom of Liberty by Bunuel”

This piece originated after listening to a piece by Luc Ferrari named Madam de Shanghai. Ferrari’s piece is a tribute to Orson Wells’ film “The Lady of Shanghai”. Ferrari uses a few samples from the film, his own field recordings, a sound world (cinema for the ears) and a notated score.

Homage to Phantom of Liberty by Bunuel uses these main layers:

1. field recordings
2. improvisation
3. pre recorded open score notation (for saxophone and electric guitar)
4. traditional notation written in Sibelius and transferred to DAW (Logic)
5. use of loops
6. samples from the film and manipulation
7. sound design

8. open score for live electronics

The idea was to write a piece that would use all these elements in a maximalist way on top of each other blending in an autonomous way. Elements were edited separately and later combined. The end result was not planned in advance and a combination of controlled chance with heavy editing was part of the end result. However the form was planned in advance and the climax of the piece was rearranged. Like Bunuel's film, the piece has political implications.

Bunuel's film stands somewhere on the border between magic realism and surrealism. Unlike Bunuel and Salvador Dali's surrealist film "An Andalusian Dog" from 1929, this late film by Bunuel from 1974 presents events in a casual way whereas they are completely illogical. Bunuel's film influenced the form of the piece. Absurd stories are presented in a logical way following one another in a disjointed way, interrupting one another. Likewise, I decided to try to do the same in the form of the piece when miniature pieces follow one another as they interrupt each other. The dense texture of the piece with various components at the same time and sometimes combinations that are purposely somewhat odd such as a melodica with sequencer synths, or a saxophone jazz solo with electronics, electric guitars with voices from the film, and more contributed to a sense of something presented in casual and logical way that is slightly off and aiming for a sense of magical realism in the music. Like the film the miniatures interrupt one another and try to create a sense of continuity from disjointed elements.

Form

Part 1: A (20 seconds) B (22 seconds) C (41 seconds) D (40 seconds) E (46 seconds) F (50 seconds)

Part 2: A (12 seconds), B(10 seconds), C (42 seconds), D (55 seconds)

Part 3: A (52 seconds) B (25 seconds) C (64 seconds)

Part 4: A (26 seconds), B (20 seconds), C (65 seconds), D (240 seconds)

Part 2D and 3C have both a sense of ending to them (they work as bookends). Part 2D uses various saxophones in overdubs playing long tones as a background layer. Part 3D uses various electric guitars in overdubs layered on top of each other. Both parts are relatively soft to other parts.
Part 1D, E and F are essentially one unit, which lasts (136 seconds) compared to part 4D (240 seconds). These two parts also work as bookends because of their sense of repetition of similar motives. Both Part 1 and Part 4 are the longest sections compared to Part 2 and 3.

Field recordings

The field recording used in this piece are car mostly car sounds, rattling keys, doors closing and a repeating warning sound from the car system that appears when the door is not closed. I also used a sound of car washing. The car washing comes in part 4D as a sort of climax in the piece. The following are examples of how I used these sounds in the mix:

1. Repeating warning sound from the car system that appears when the door is not closed. There is imitation of this sound in the synthesizer when the sound is looped. The audio files B.1 and B.2 show the resemblance between the two.
2. A sound of a closed door in a loop in part 2C (this can be heard in audio file B.3)
3. The sound of a car wash from inside the car. In this excerpt there are various other layers as well (electric guitar harmonics and sirens, for example). This can be heard in B.4

Improvisation

The piece uses improvisation as one of its layers. There are two main types of improvisations: completely free improvisations that were recorded spontaneously edited and than used in the piece and pre-determined improvisations with restrictions. The free improvisations were mainly done with analog sequencers, the restricted improvisations were for melodica, saxophone and loop pedal with vintage Casio keyboard. This can be seen in the following clips:

4. Saxophone improvisation on top of 4 note melody in 3A. This can be heard in B.5
5. Melodica in Part1C. This can be heard in B.6

Open Score Notation (pre-recorded)

Open score with general instructions exist particularly for the guitar in Part 3C and Part 4D.

1. Part 3C consists of 4 random notes that the player choses and turns the volume knob up and than down. This is overdubbed and repeated.
2. Part 4D consists of 6 overtones one chooses in adjacent strings. This is overdubbed and repeated.

Traditional notation written in Sibelius and transferred to DAW

Traditional notation was written in Sibelius. Various miniatures were written in Sibelius and than midi exported to Logic. In Logic I used synth plugins such as FM8 or Reaktor by Native Instruments. Figure 3-1A-15 shows an example of a score written in Sibelius that was later transferred to Logic and "performed" by synths.

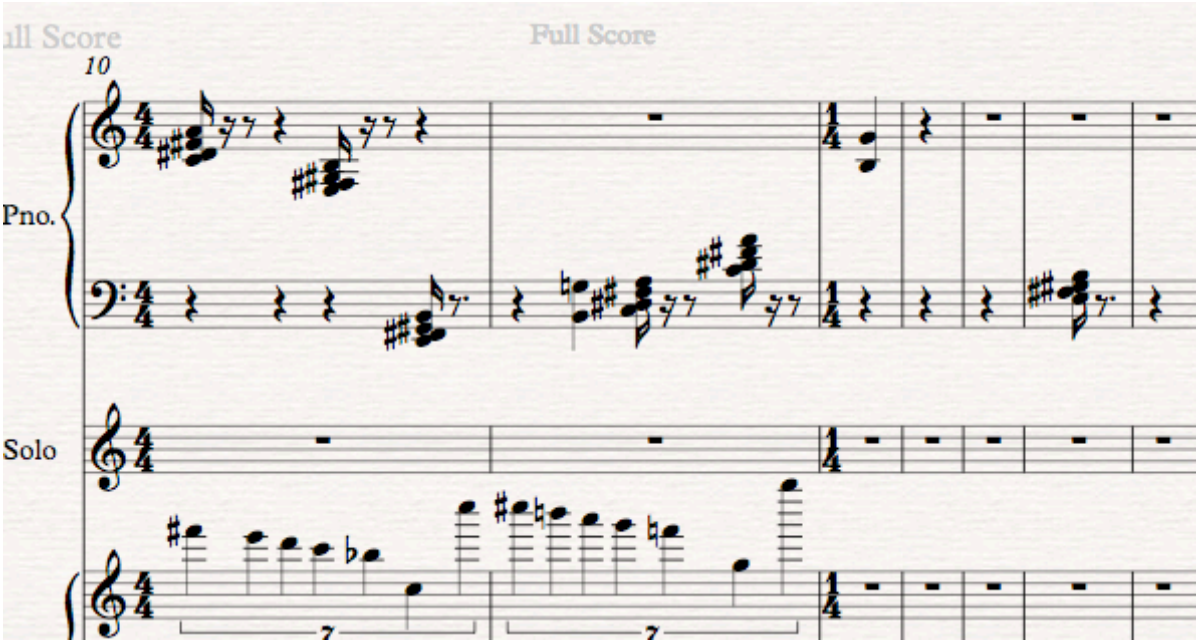


Figure 3-1A-15

Use of loops

There are four ways that I used loops in this piece:

1. With a boss loop pedal (this included a melodica and Casio keyboard looped and applied effects on).
2. With analog sequencers particularly sequences in the Korg Minilogue but also in other Korg Volca sequencers.
3. With the samples from the film that feature dialogues. These use extensive loops. There are three types of loops that are done with the WaveLab software:
   A. Simple repetitions. This can be heard in B.7 (raw file later used in mix)
   B. Loops of very short durations (milliseconds). This can be heard in B.8 (raw file later used in mix)

   C. Loops using layers on top of the other. For example the Fibonacci technique that I used previous pieces. This can be heard in B.9 (raw file later used in mix)

4. Loops and repetitions from field recordings. These have two types:
    A. Edited loops. This can be heard in B.10 (raw file later used in mix)
    B. Repetitions occurring in the recording itself for example with wipers from car wash recording, or from repeated warning sound from car system.

Samples from the film and manipulation

Various samples are used incorporating voices of men and women. I created about 50 files where voices from the film were manipulated via Wavelab.

Sound Design

There are many elements of sound design. Particularly of sound effects created in Wavelab but also in Logic. The following are examples of sounds that I made:

1. A sound of a knife. This creates a somewhat surreal effect when combined with the Jazz tune and solo in Part 3A (B.11).
2. The sound of saxophones that were used to create a passing train sound. The sounds were doubled pitch shifted and used ring modulation (B.12).

Open score for live electronics

The final layer of the piece was of live playing with many of the same materials done for creating the playback (fixed media) of the piece. The instructions came by form of trial and error. Every part has general instructions of actions that the performer has to do in every part.

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1. Ferrari, Luc. *Les Arythmiques*. Blue Chopsticks C0218, 2009. CD.
2. Roads, Curtis. *Composing Electronic Music: A New Aesthetic.* New York, Oxford University Press. 2015
3. Williams, Jan. An Interview with Morton Feldman. *Percussive Notes.* September 1983
4. Caux, Jacqueline. Almost Nothing with Luc Ferrari. Berlin, Los Angeles, *Errant Bodies Press.* 2012

Appendix A – Audio Excerpts From Part 1

Les Arythmiques - Luc Ferrari

A.1 Les Arythmiques Movement 1.aif

A.2 Les Arythmiques Movement 2.aif

A.3 Mov1 0-14 seconds.wav

A.4 Mov1 32-35.wav

A.5 Mov1 256-258.wav

A.6 Mov1 355-357.wav

A.7 Mov2 39-40.wav

A.8 Mov2 30-40.wav

A.9 Mov2 156-158.wav

A.10 Mov2 222-223.wav

A.11 Mov2 147-148.wav

A.12 Mov2 347-350.wav

A.13 Mov2 420-423.wav

A.14 Mov2 609-618.wav

Appendix B - Audio Clips referring to Part 2 (Analysis of author's scores)

B.1 .aif

B.2.aif

B.3.aif

B.4.aif

B.5.aif

B.6.aif

B.7.wav

B.8.wav

B.9.wav

B.10.wav

B.11.aif

B.12.aif

Appendix C - Scores

C.1 24 Shrinking Miniatures – For Player Piano

C.2 Marco at the Record Store – For Vibraphone, Flute, Tenor Saxophone, Cello and Fixed Media

C.3 Smalltown – For Solo Piano

C.4 Death of a Moon – For Seven Contrabasses and Fixed Media

C.5 Trichromatic – For Electric Guitar

C.6 Three Poems by Andrew Choate – For Soprano, Player Piano and Fixed Media

C.7 Homage to Phantom of Liberty by Bunuel – Fixed Media

C.8 Cellular Automata Variations – Fixed Media

C.1

24 Shrinking Miniatures (2017)

For Player Piano

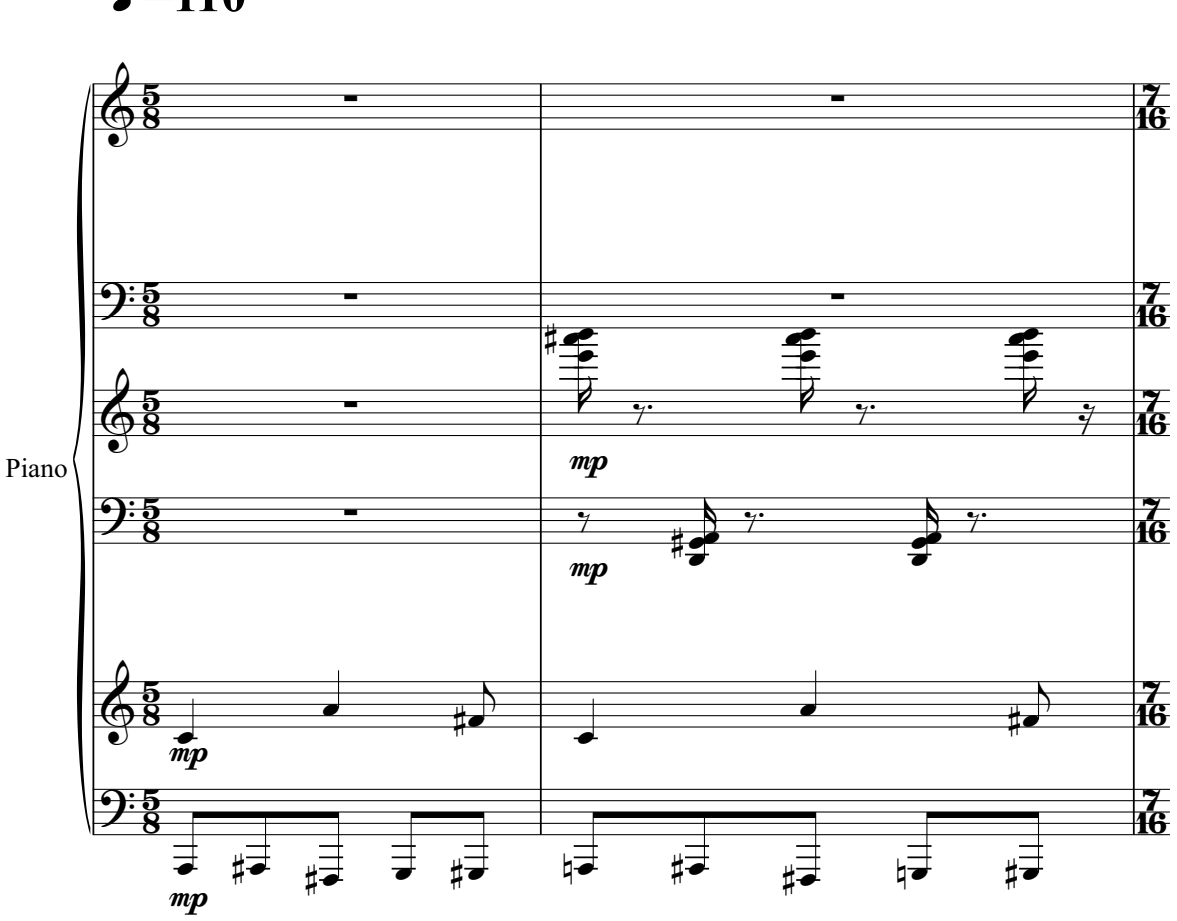
Ori Barel

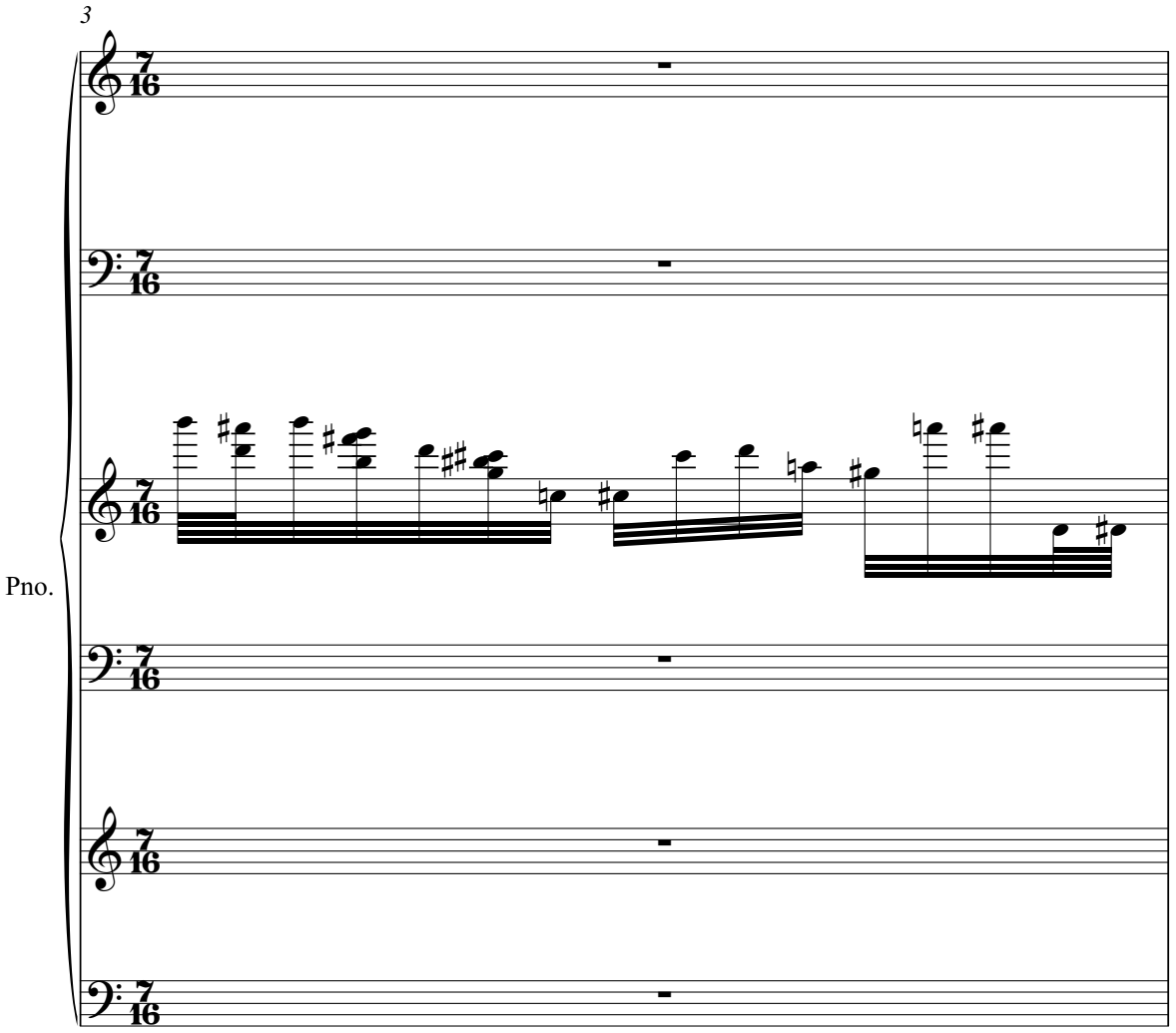
24 Shrinking Miniatures
for Player Piano

24 Shrinking Miniatures

1.

Ori Barel

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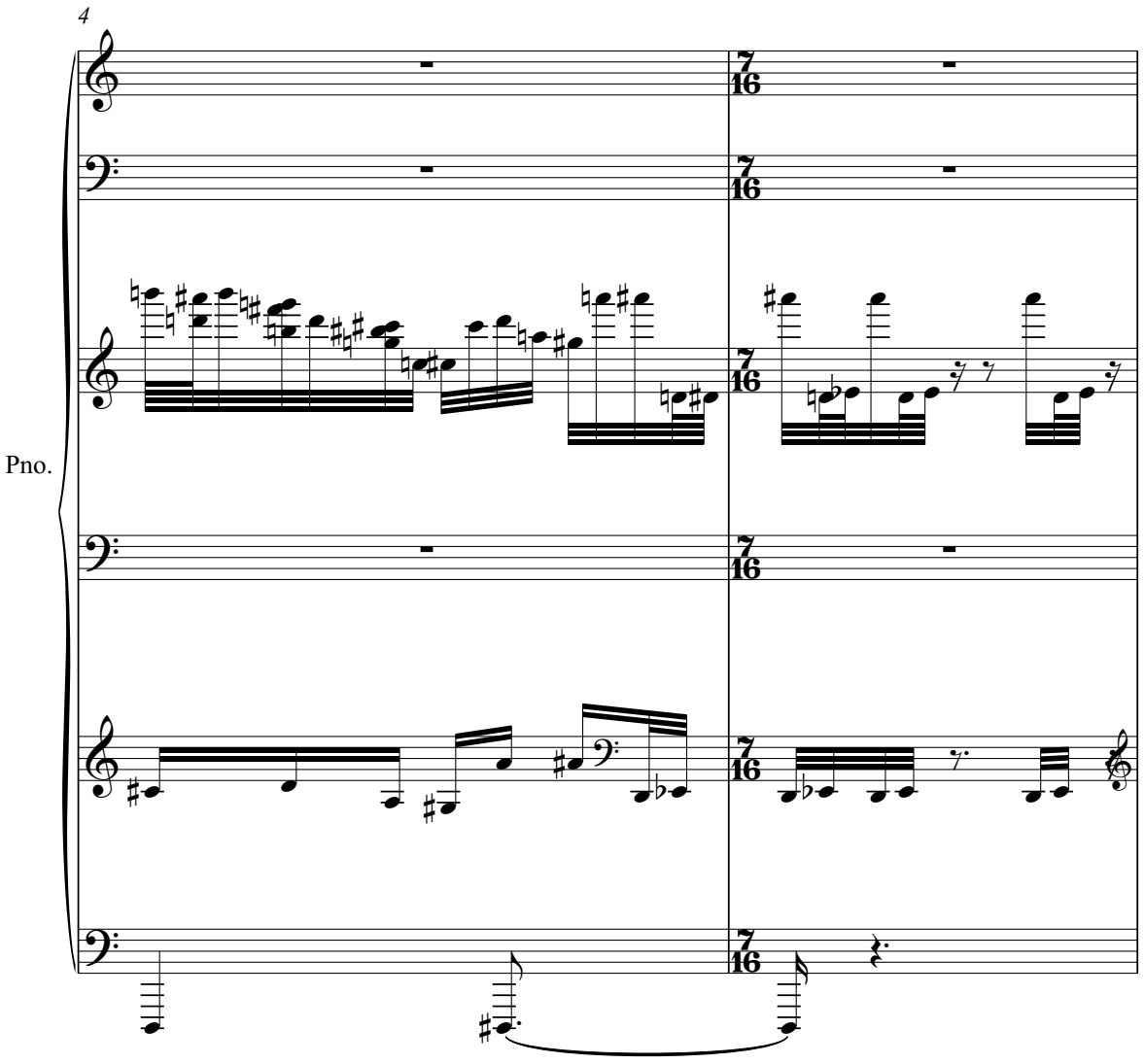

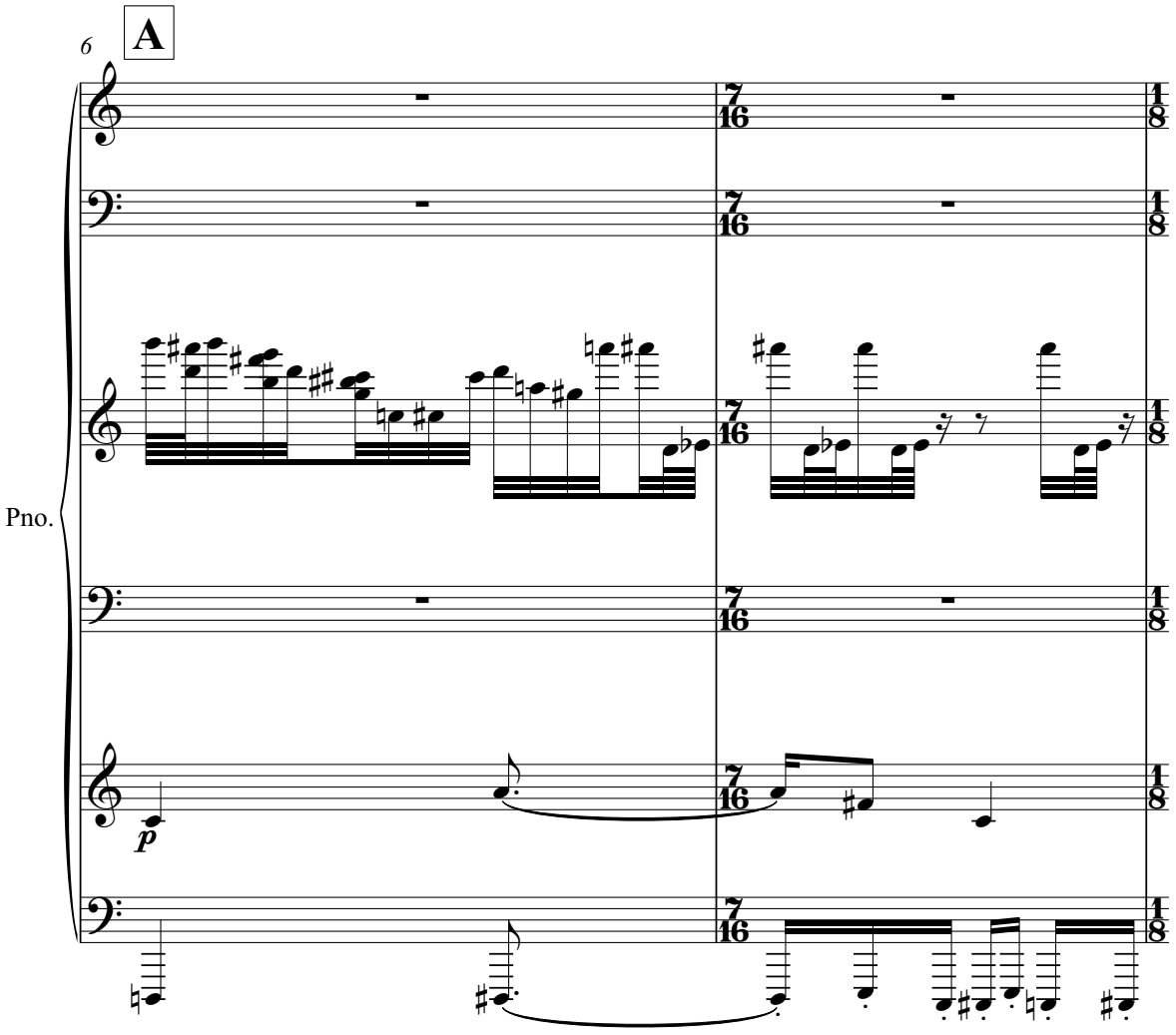
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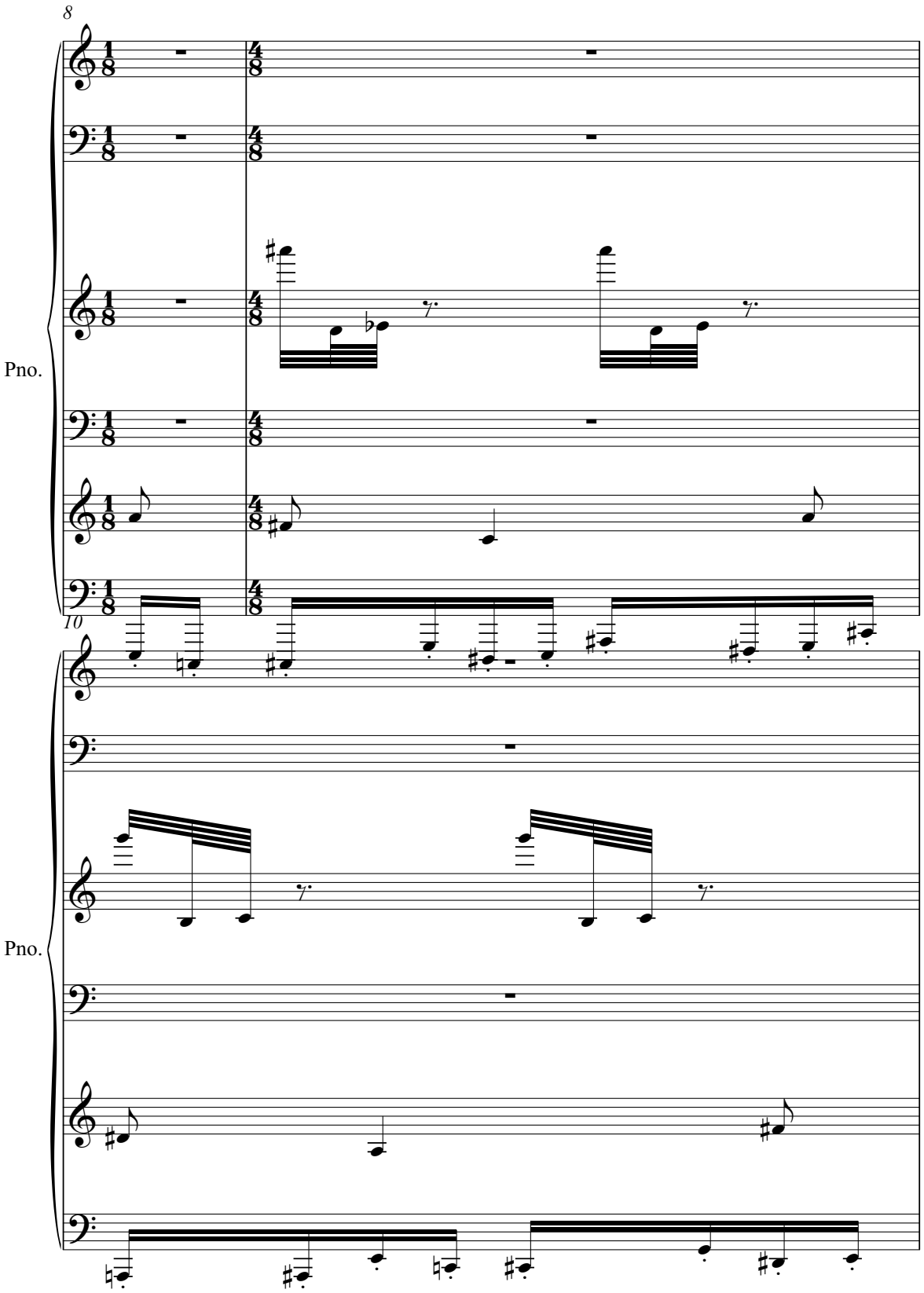
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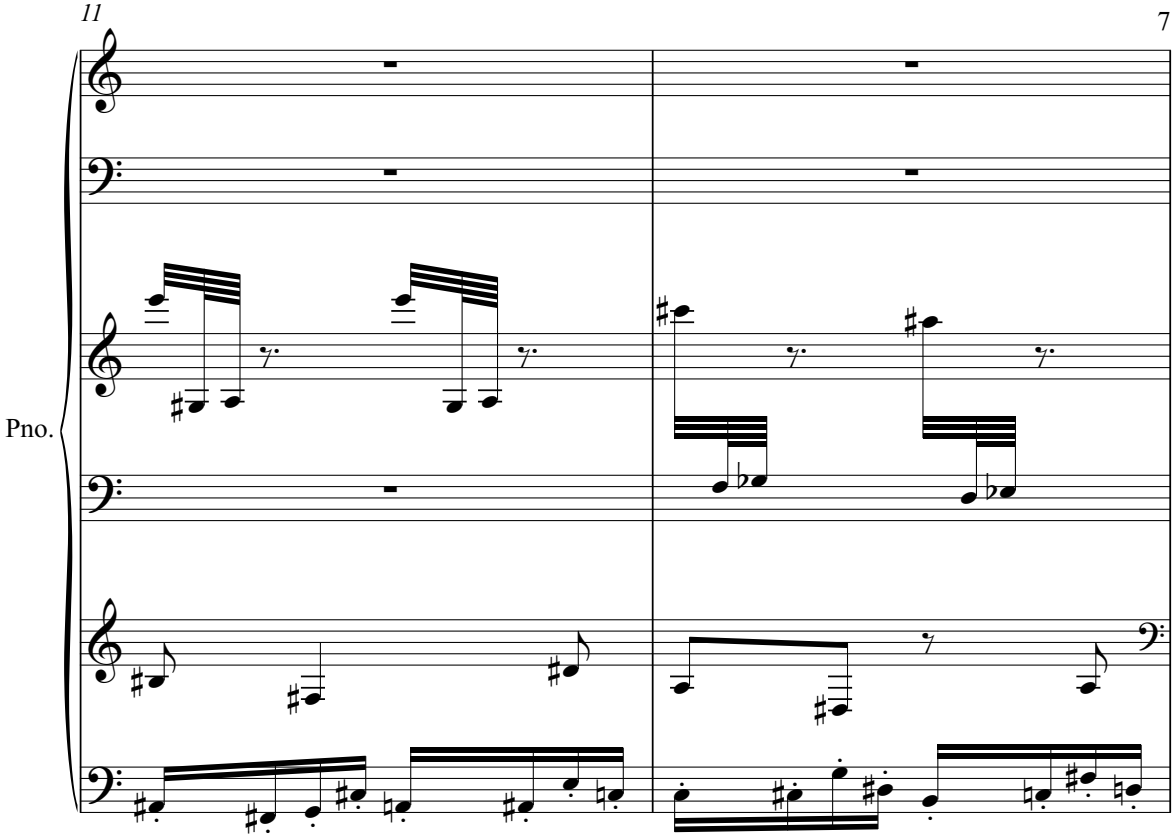
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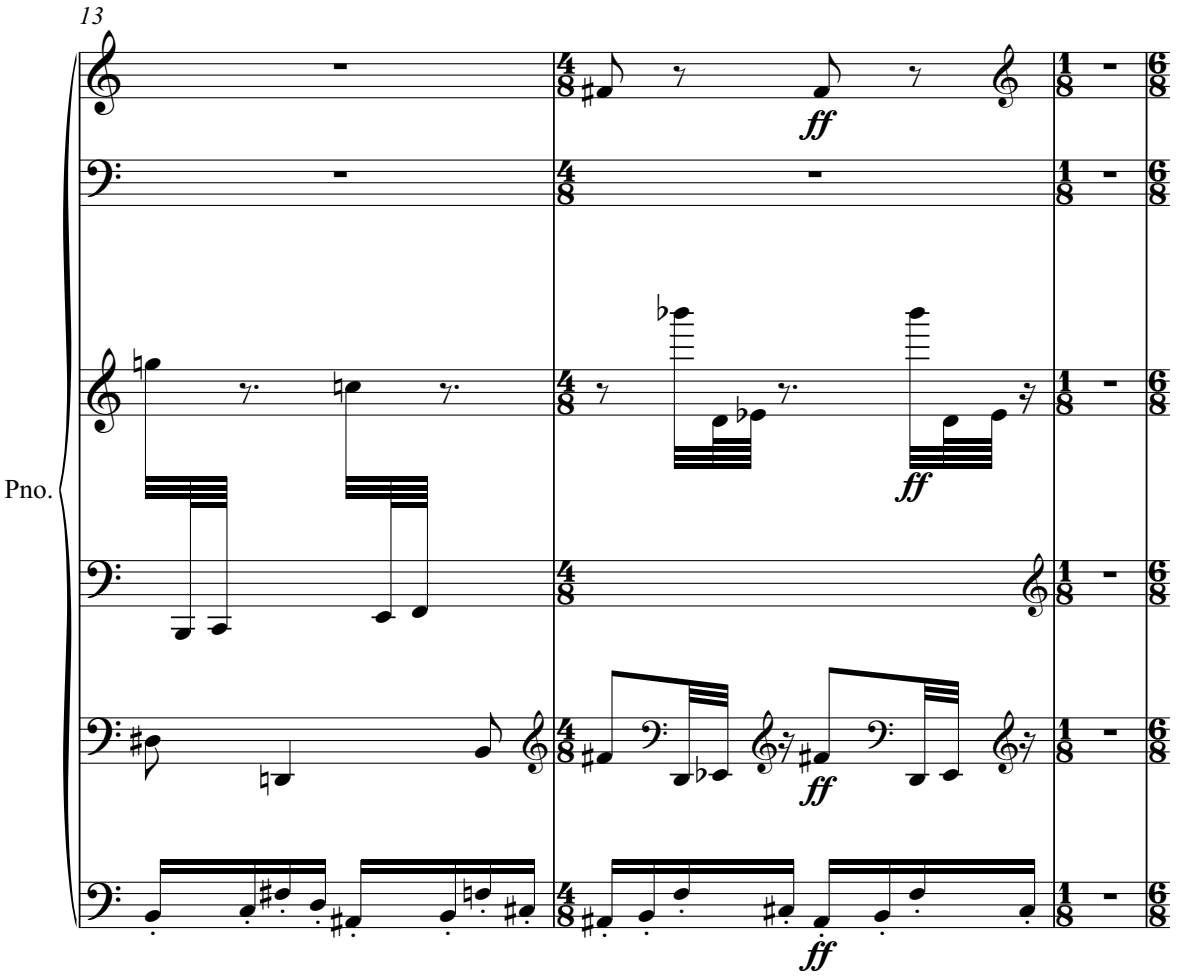

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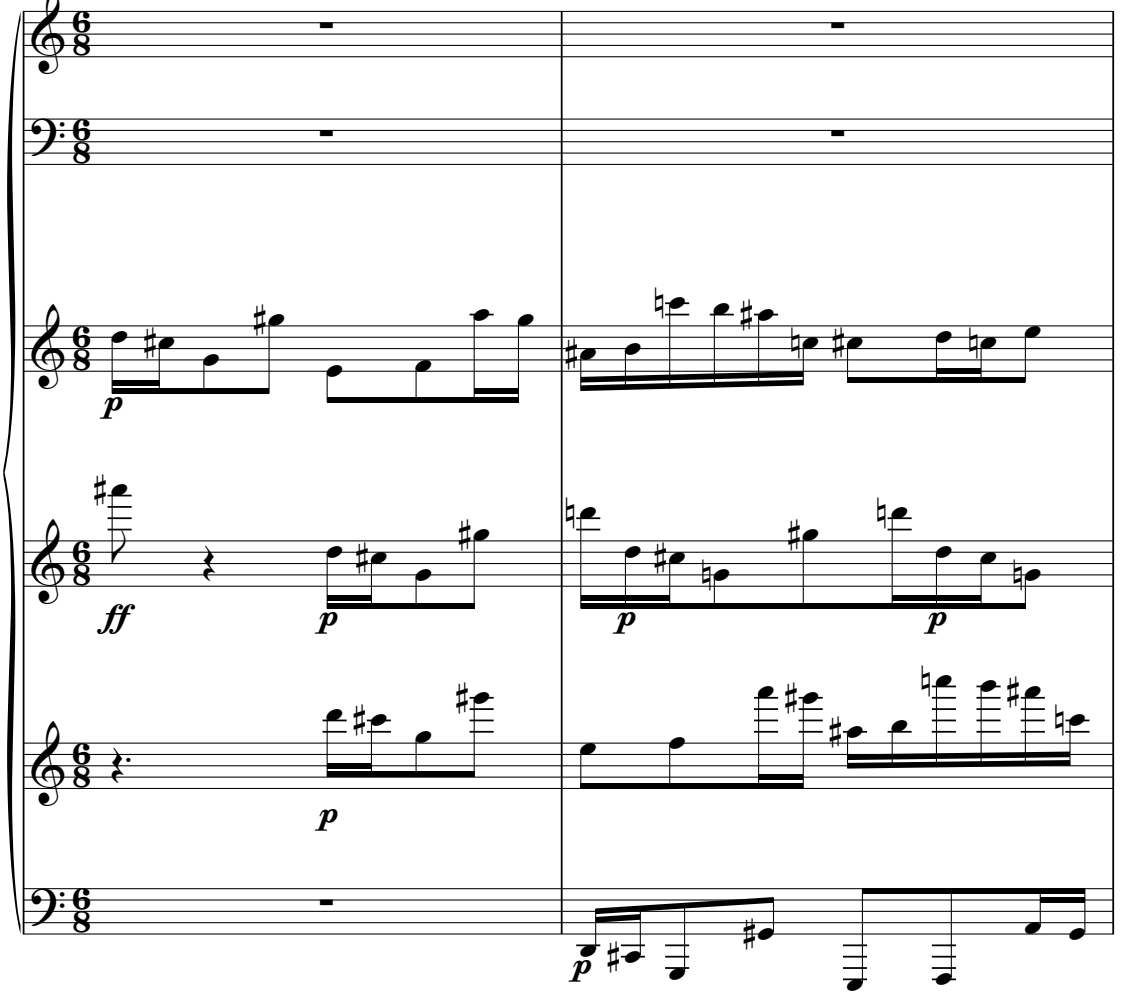

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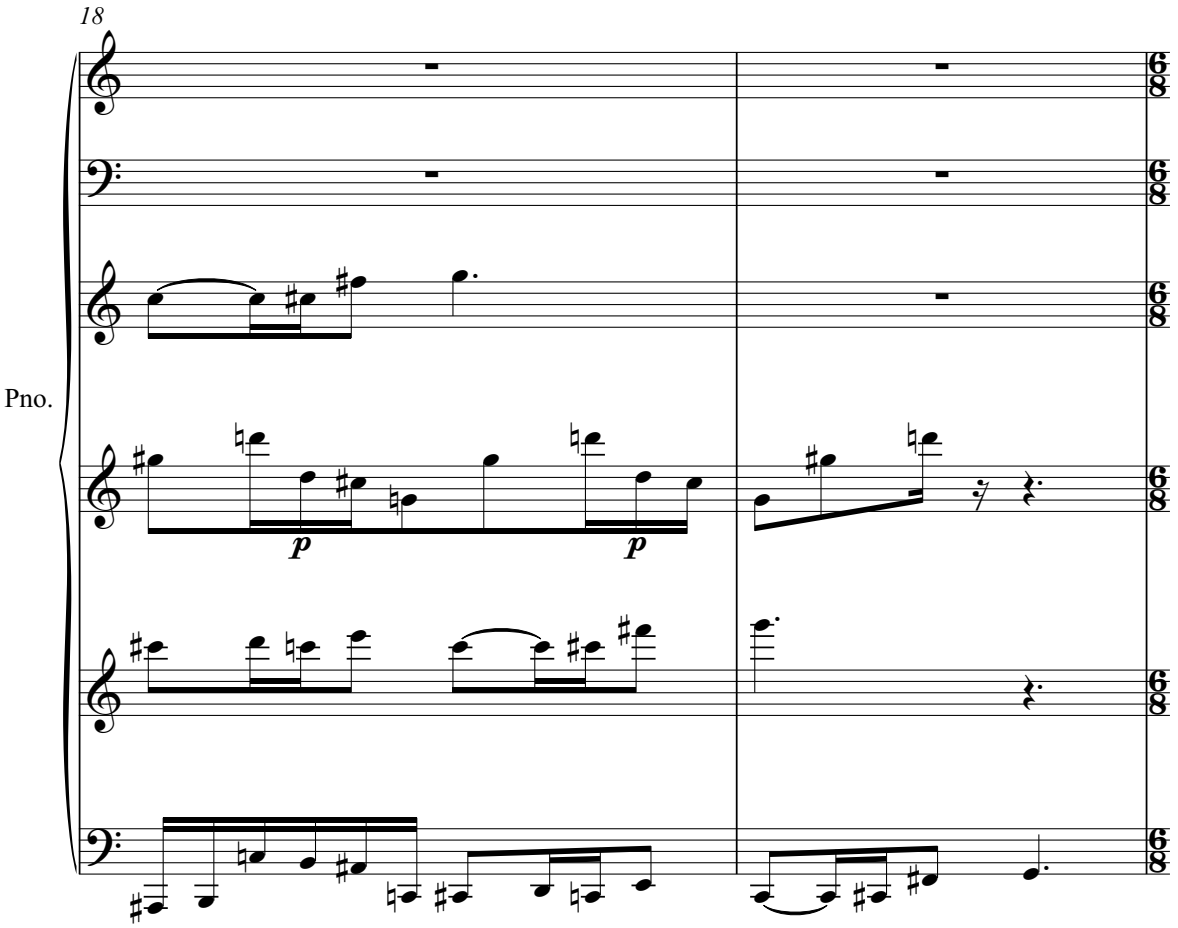

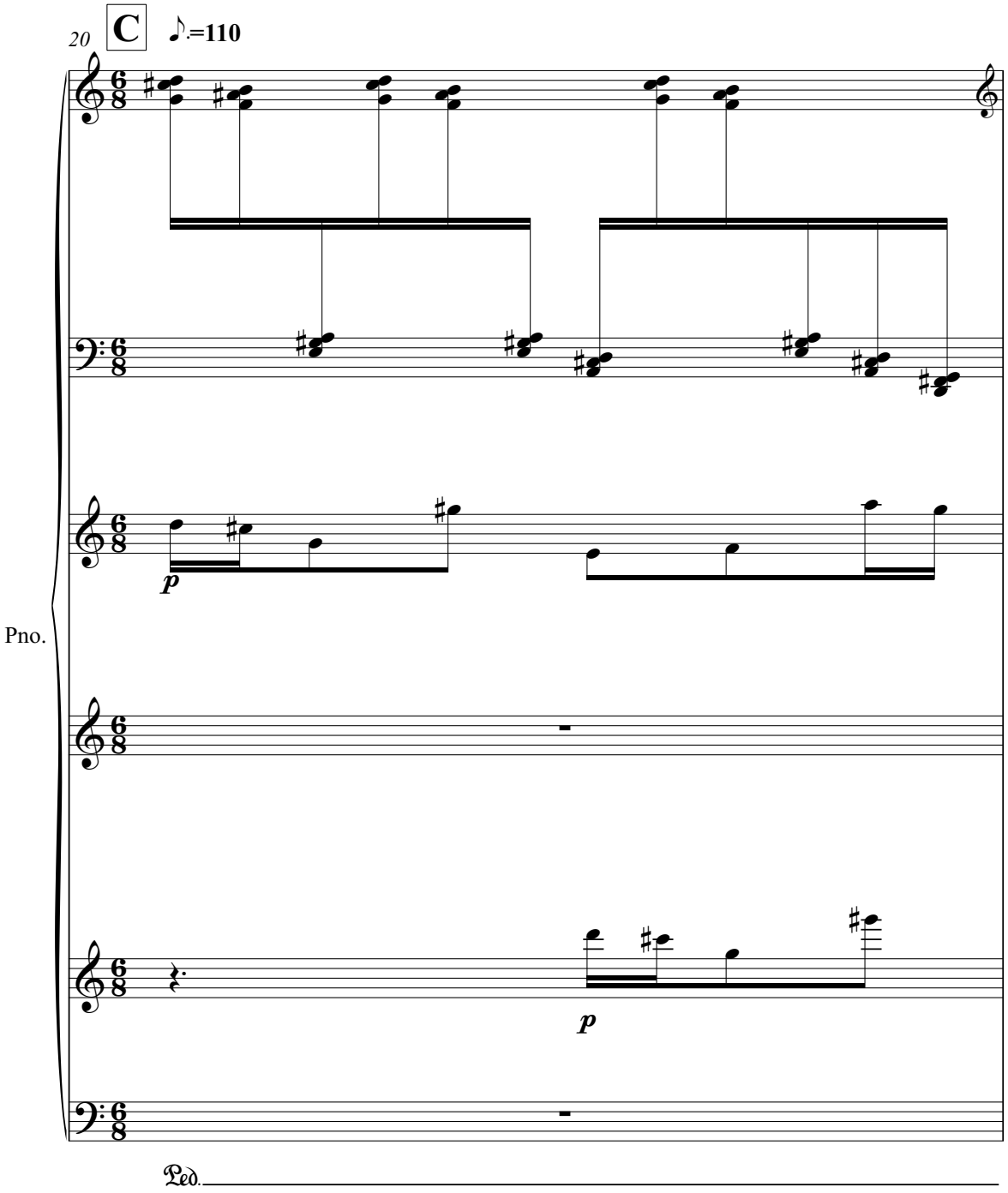
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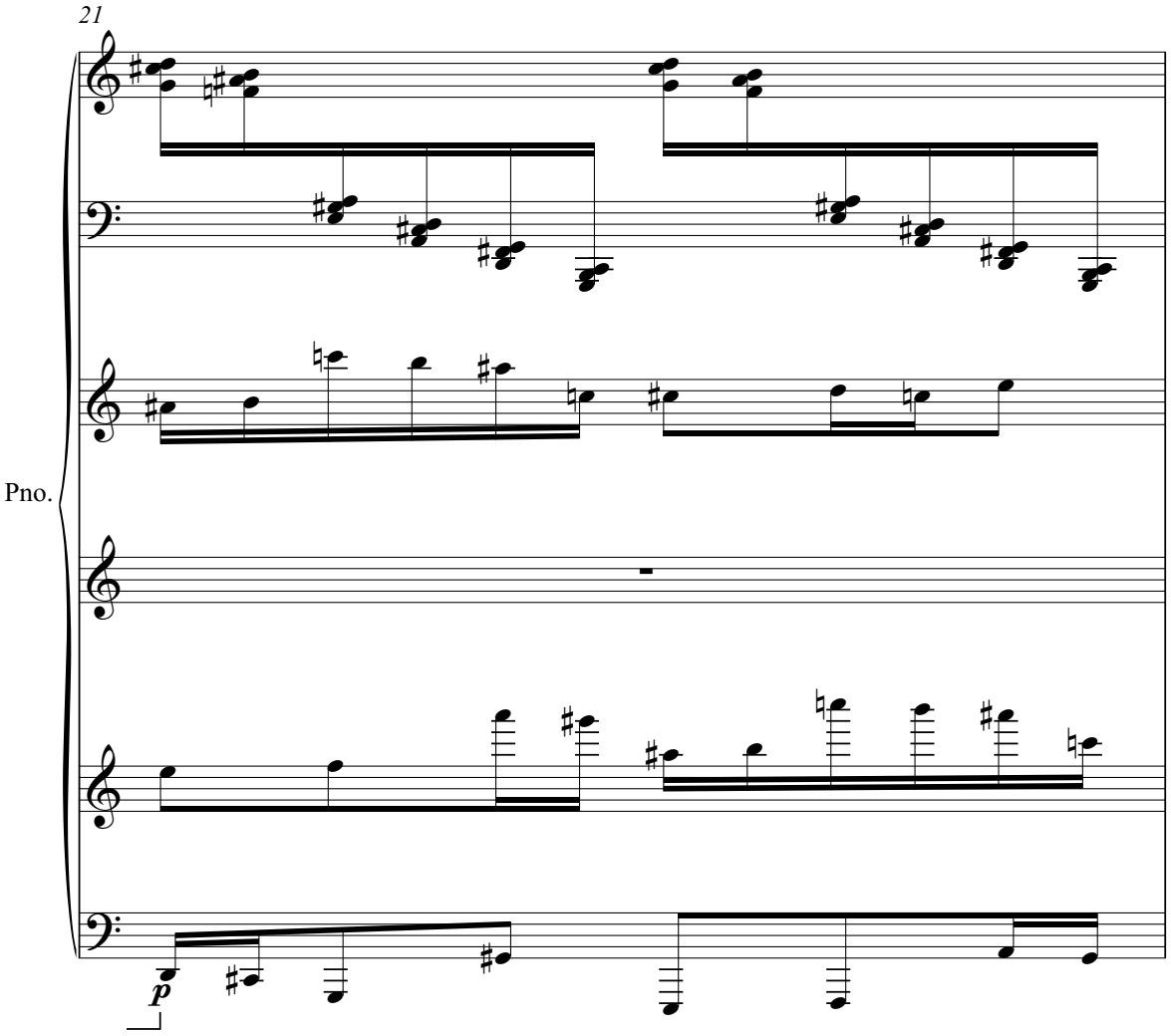

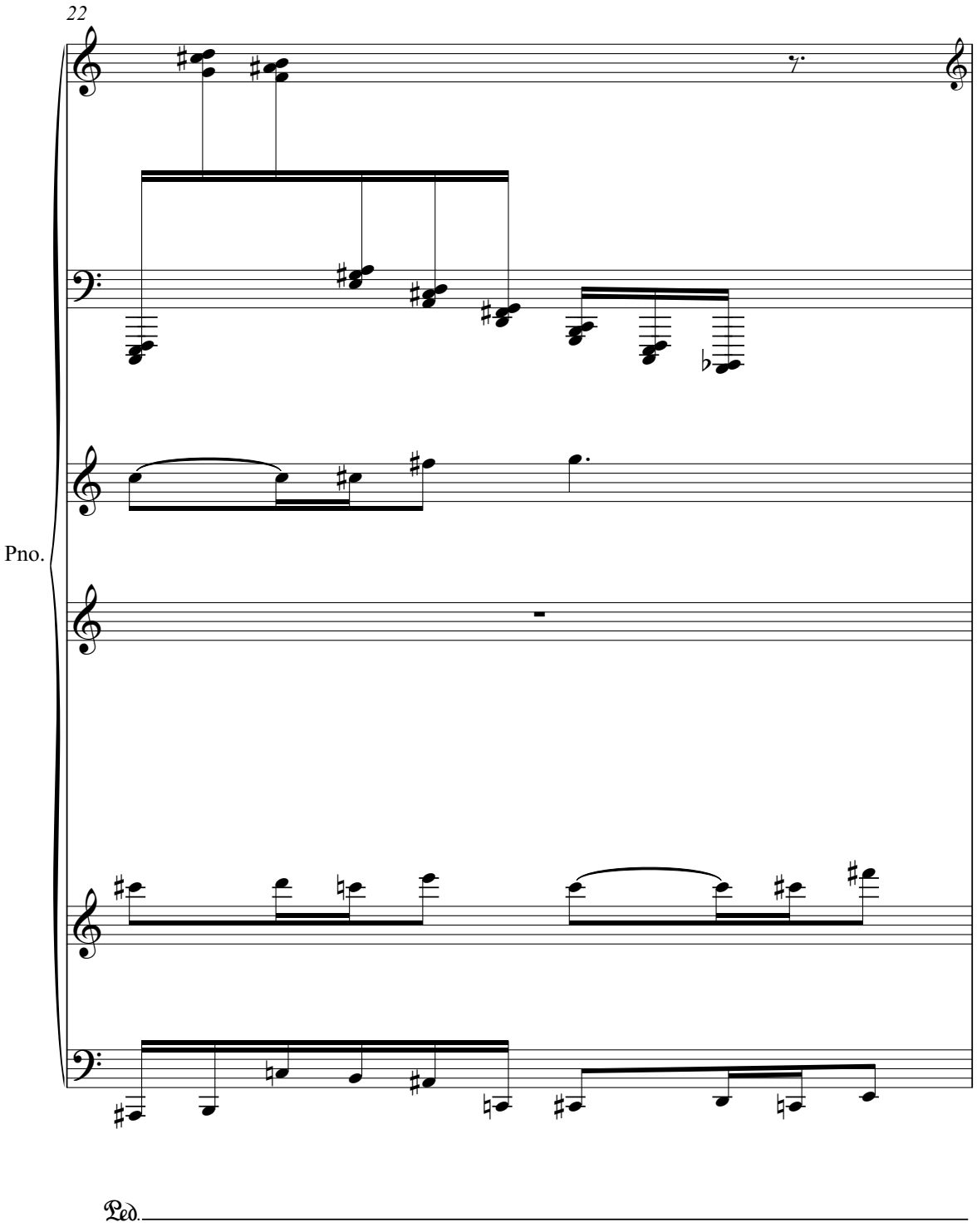
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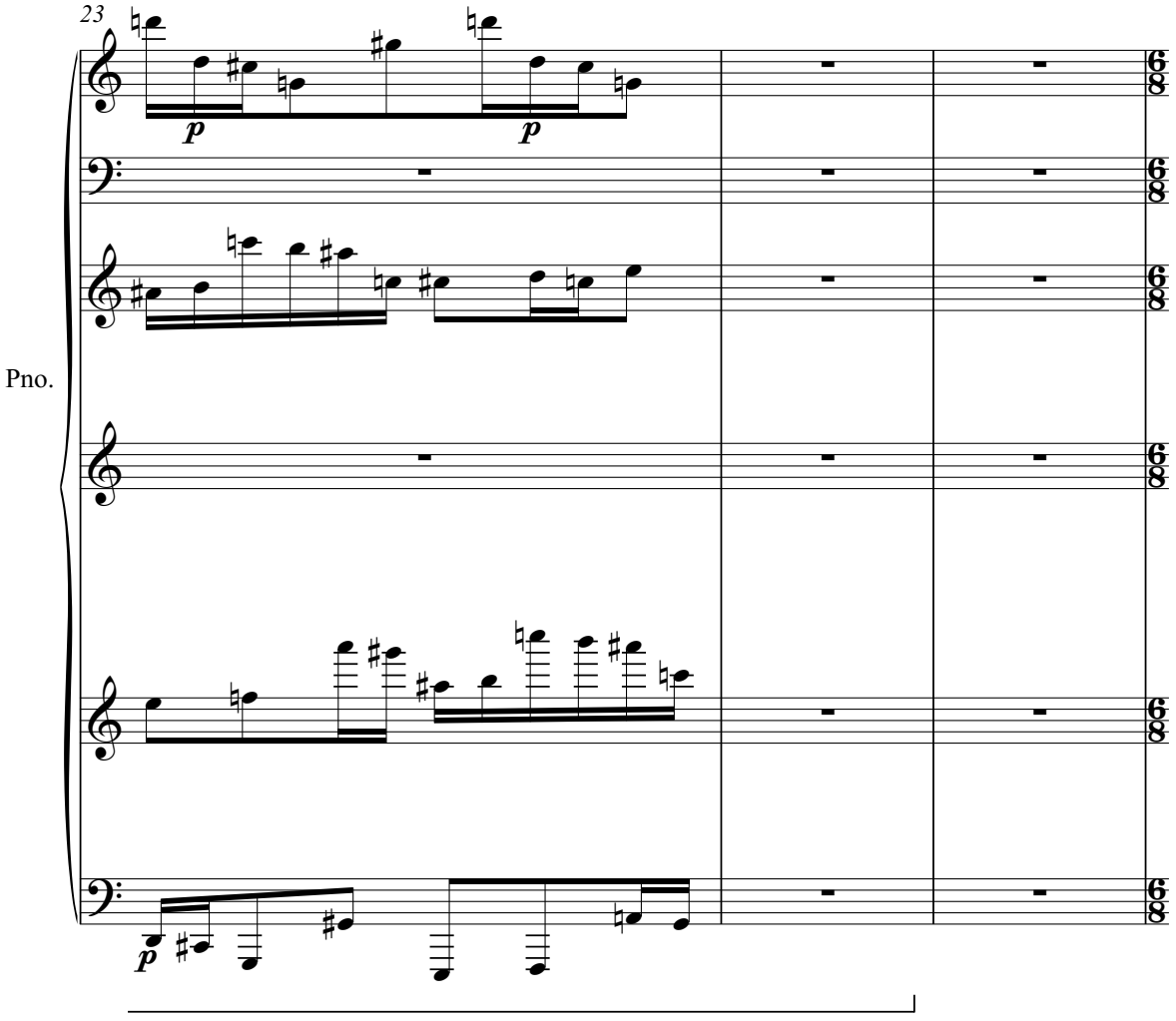
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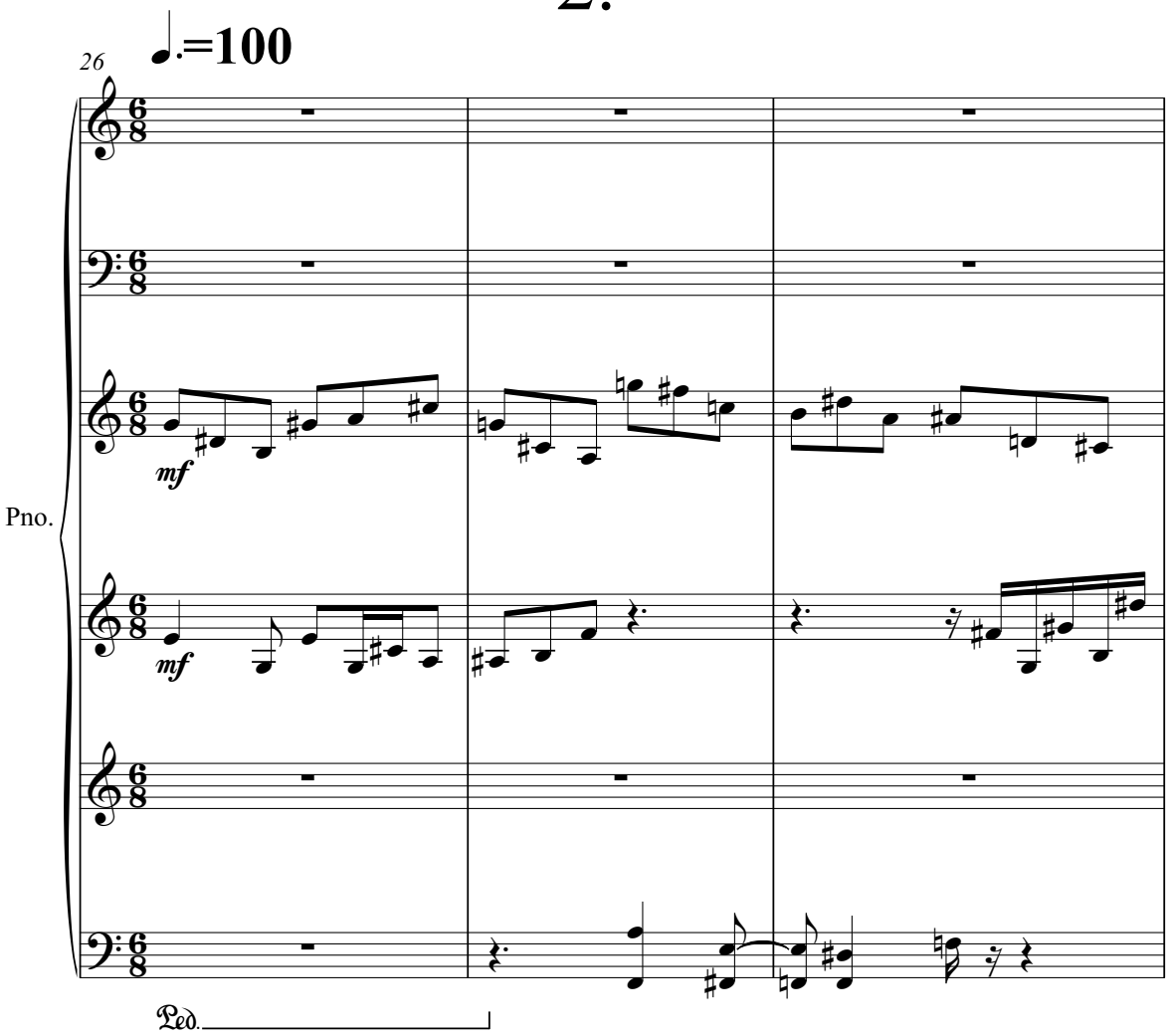

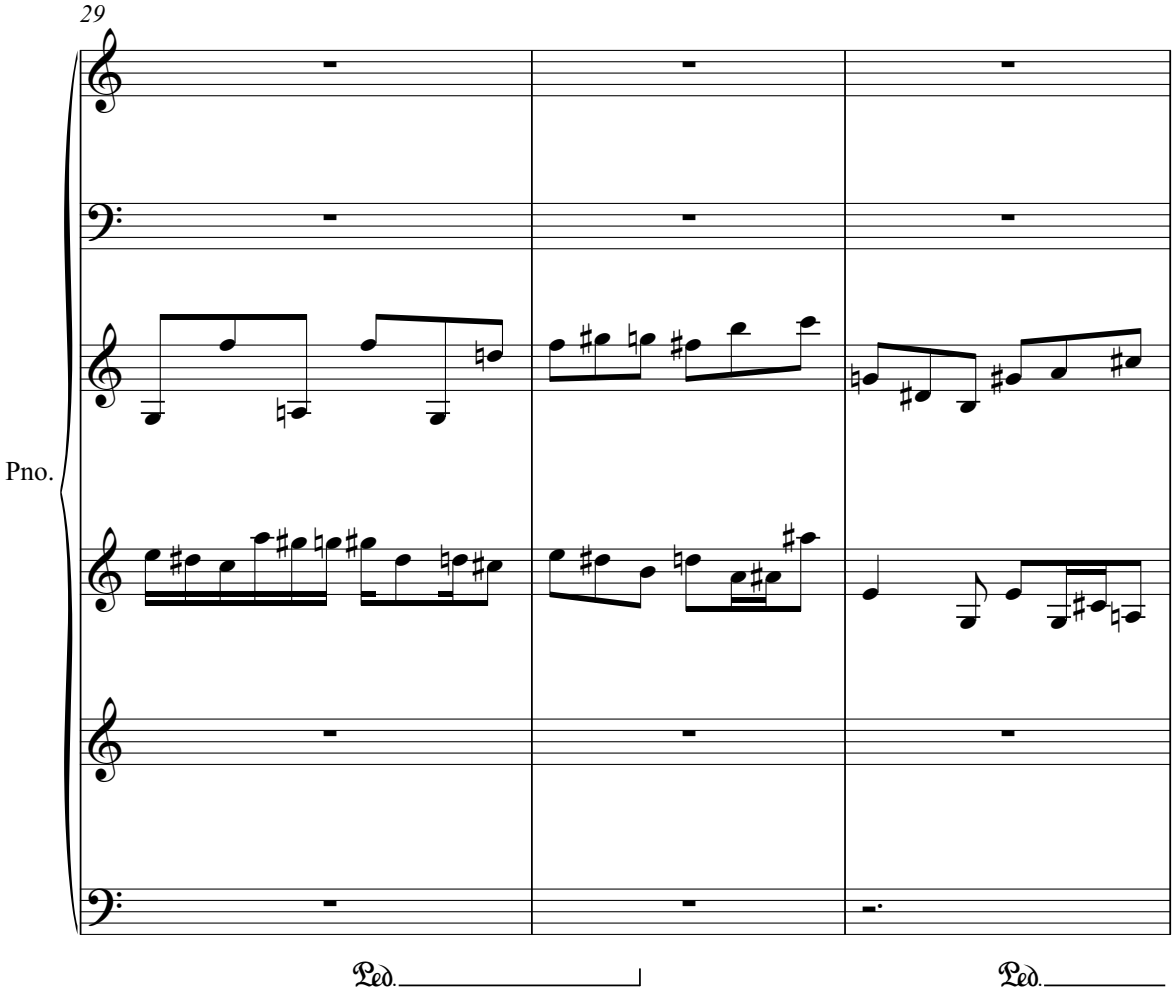
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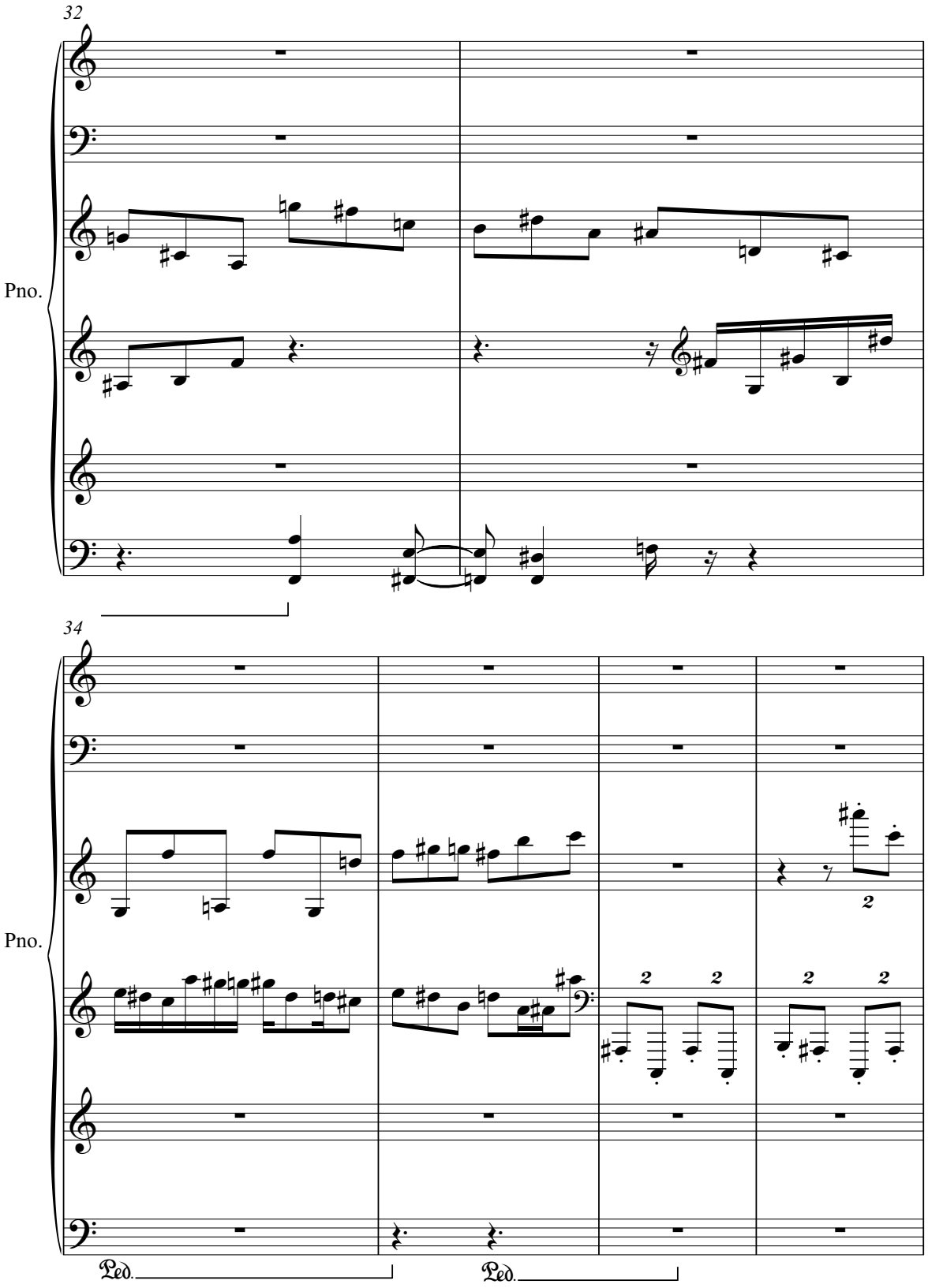
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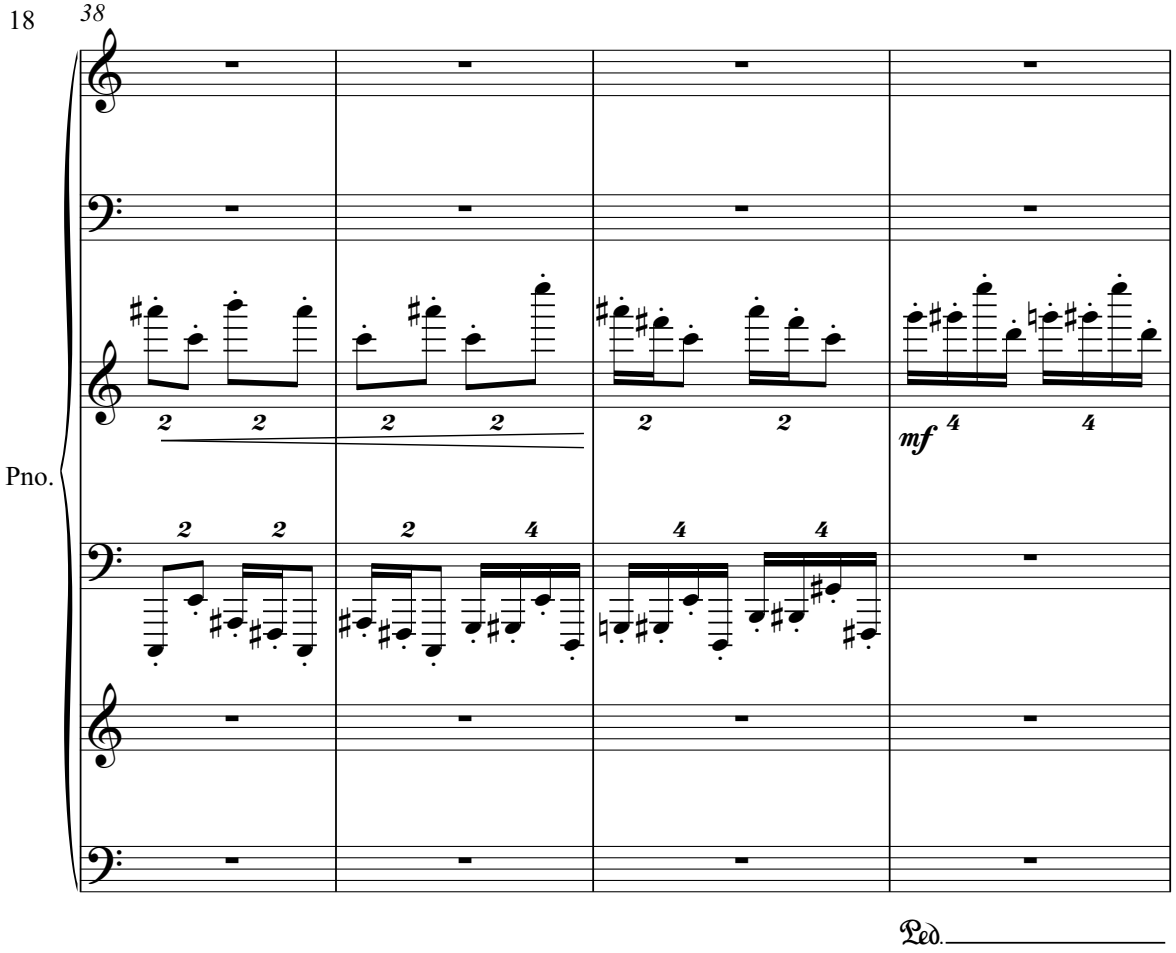
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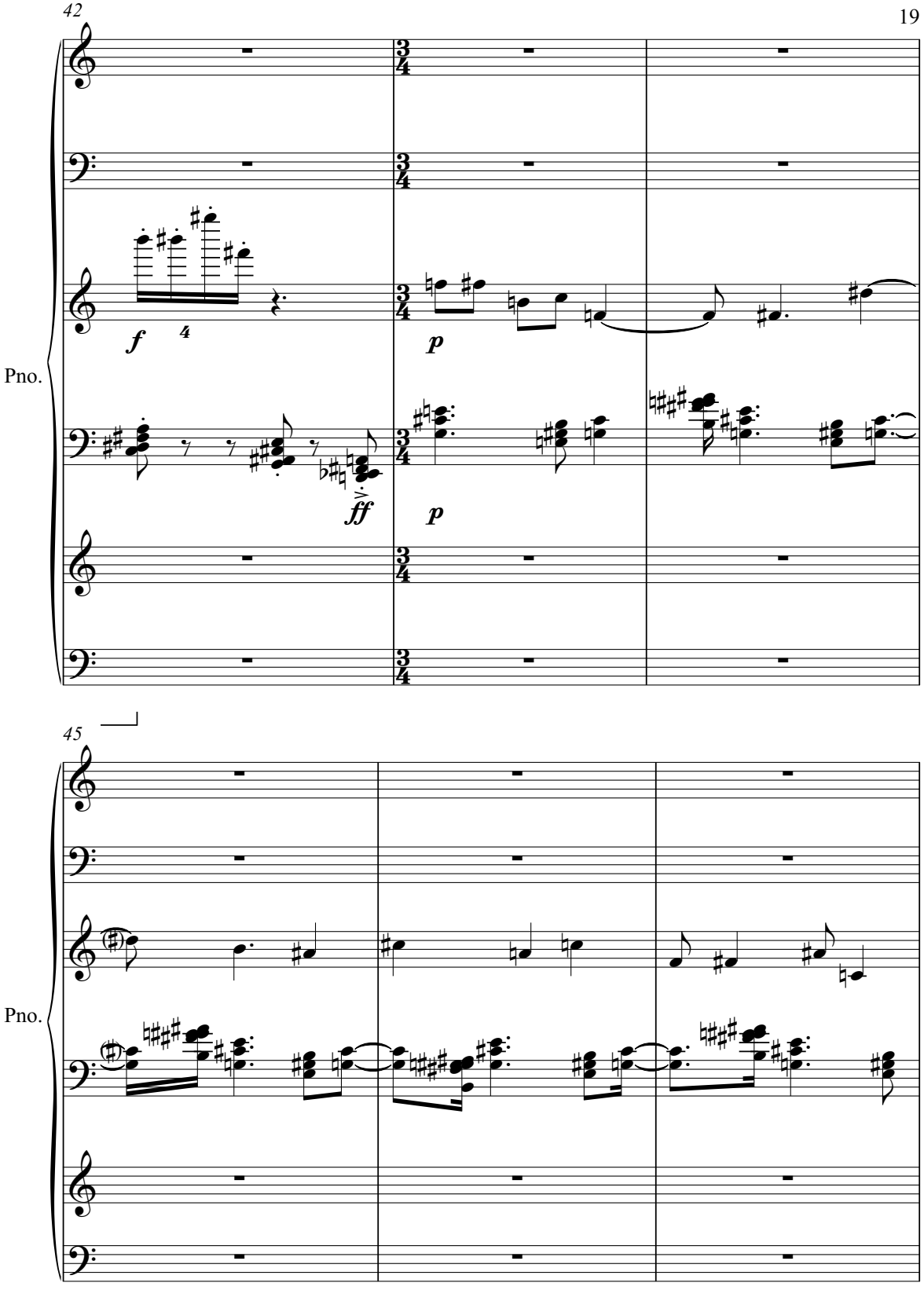
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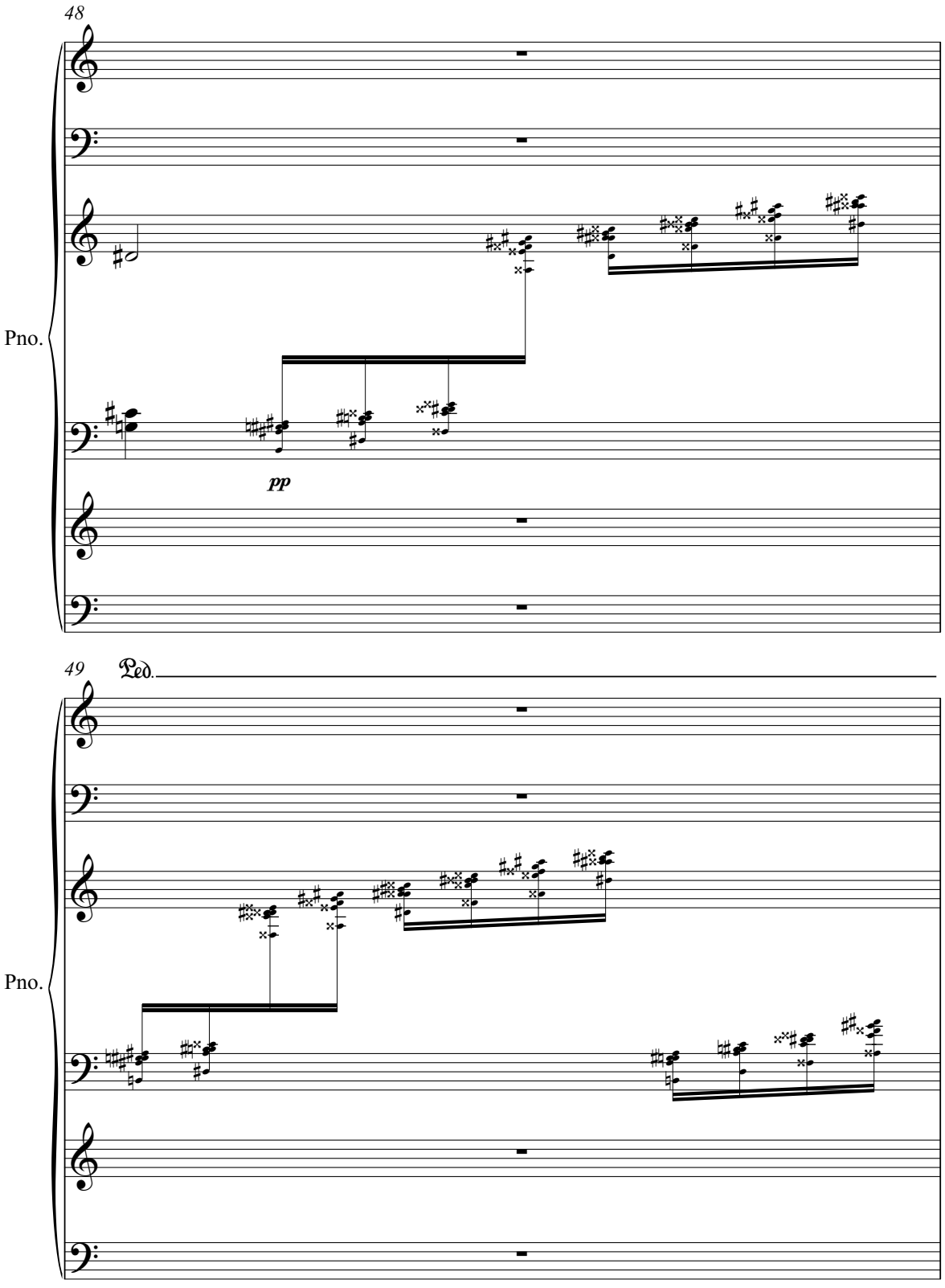
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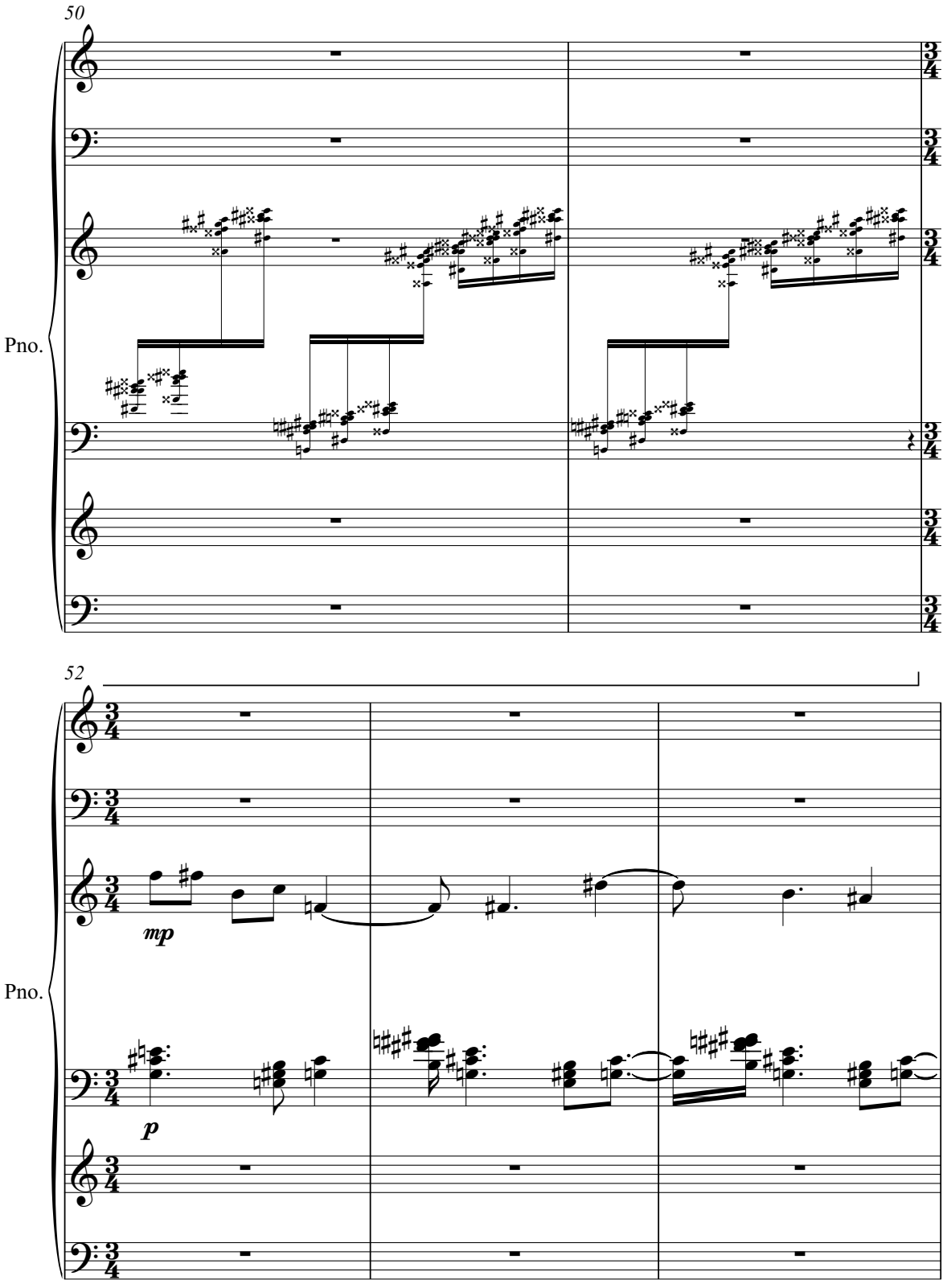
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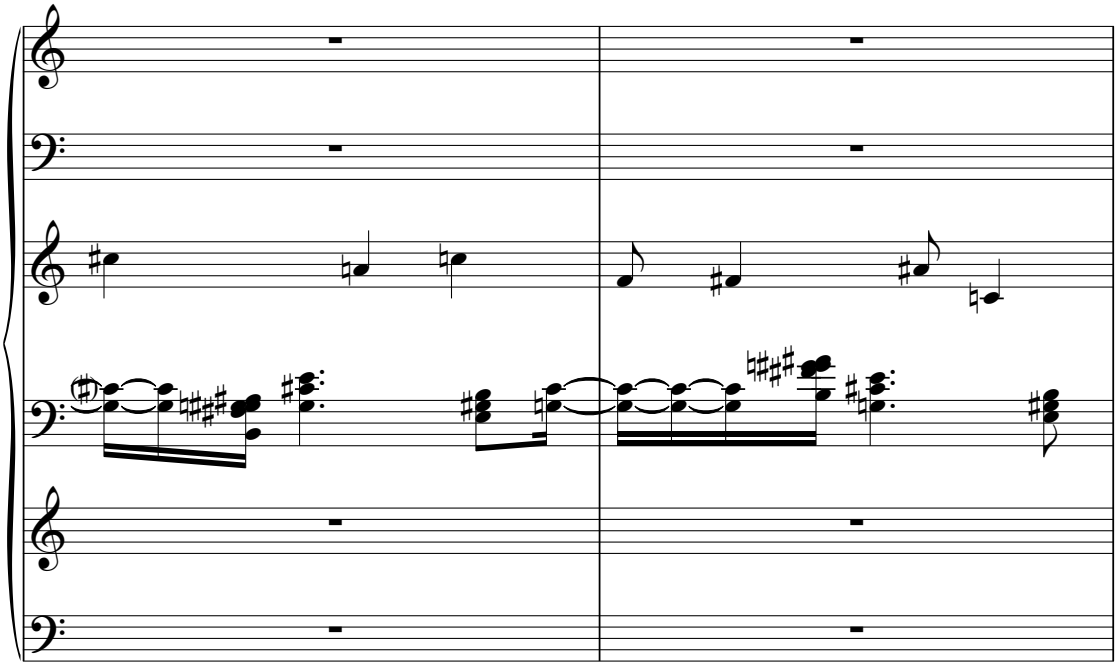

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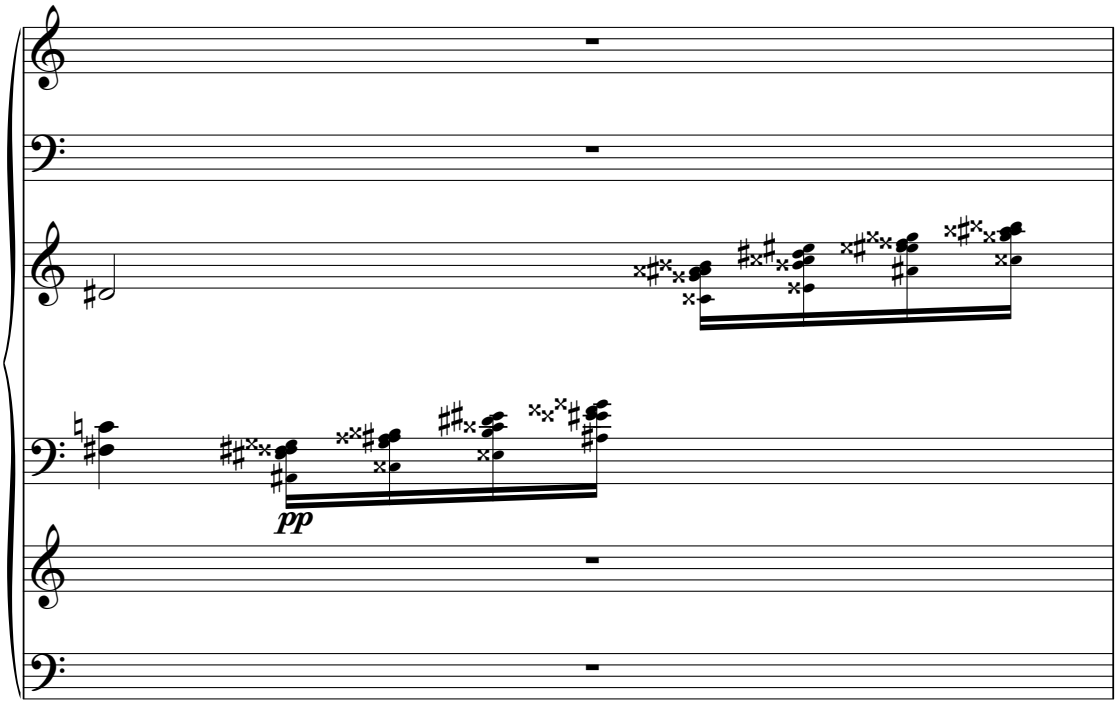

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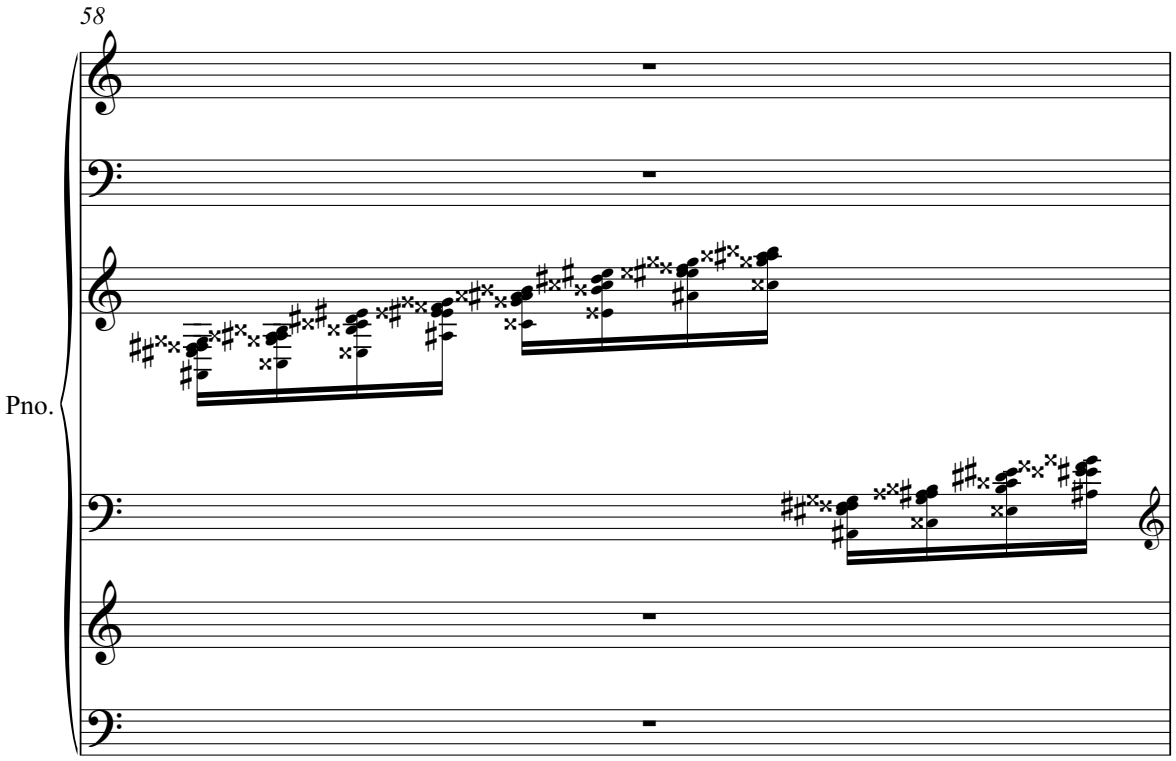
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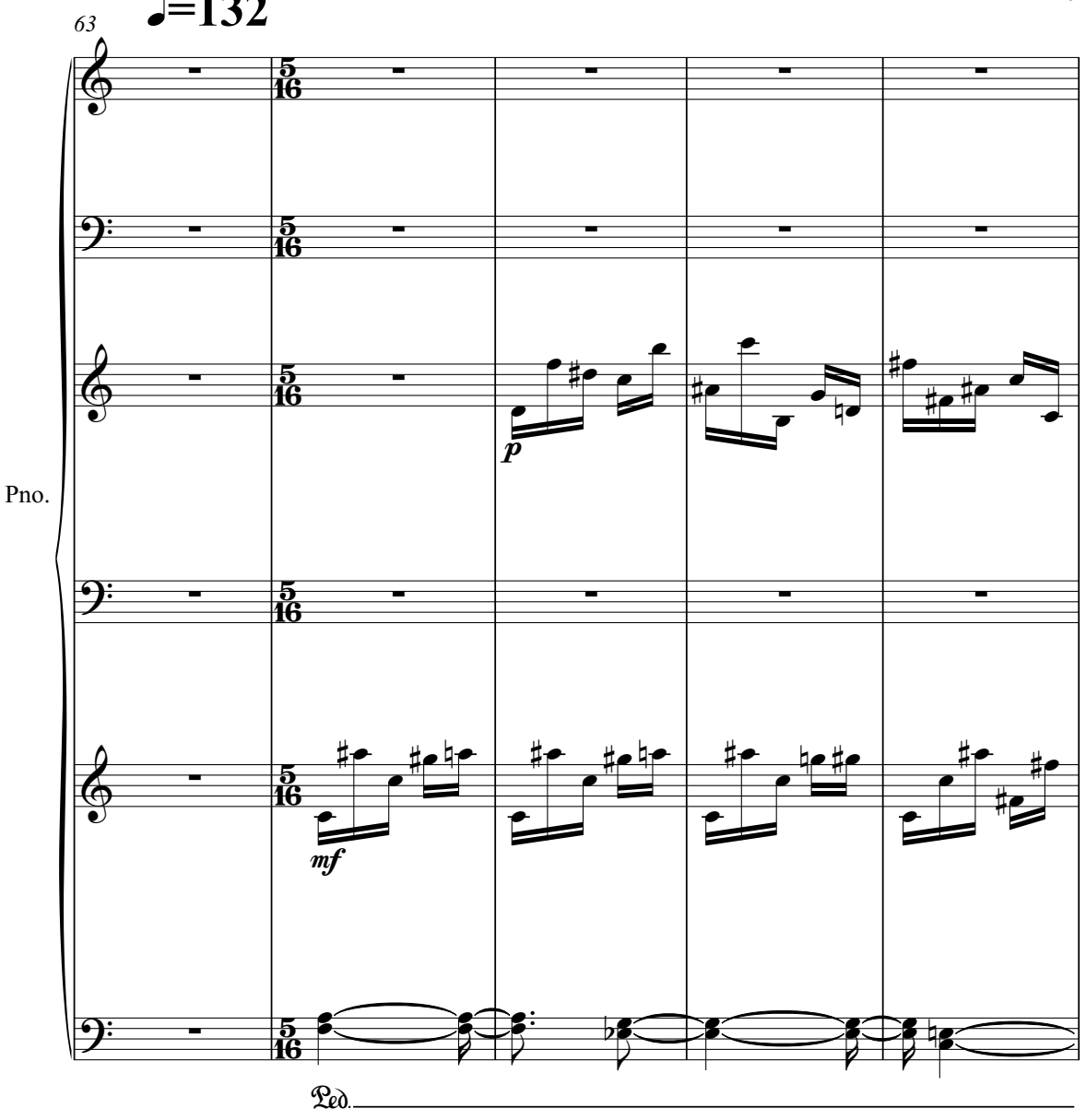

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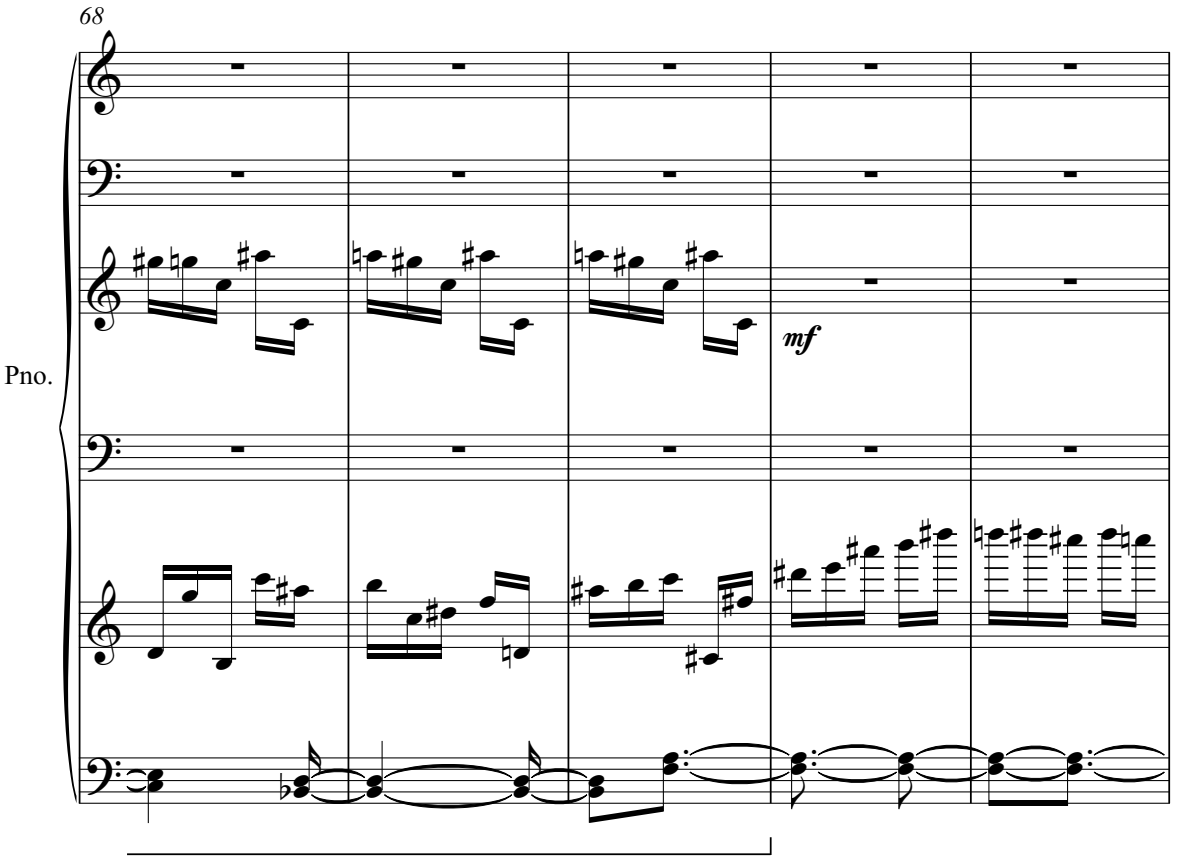

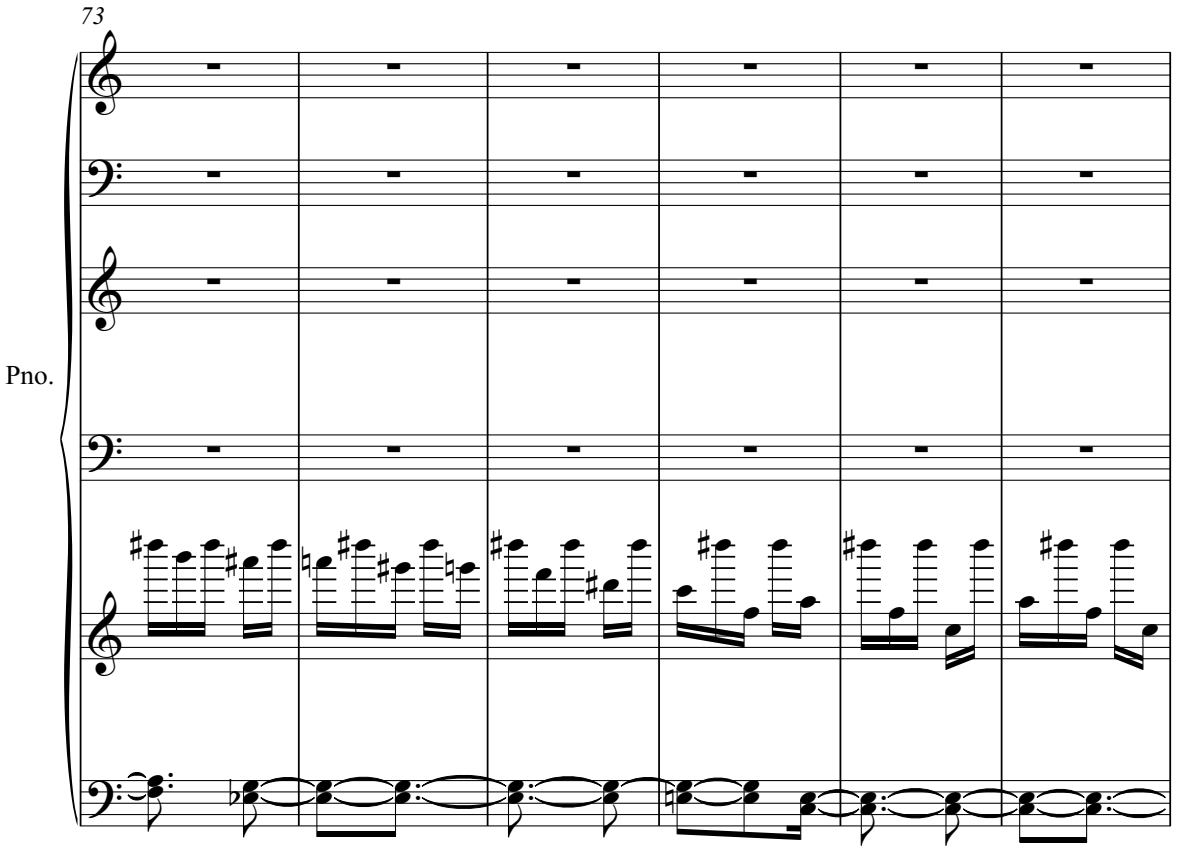
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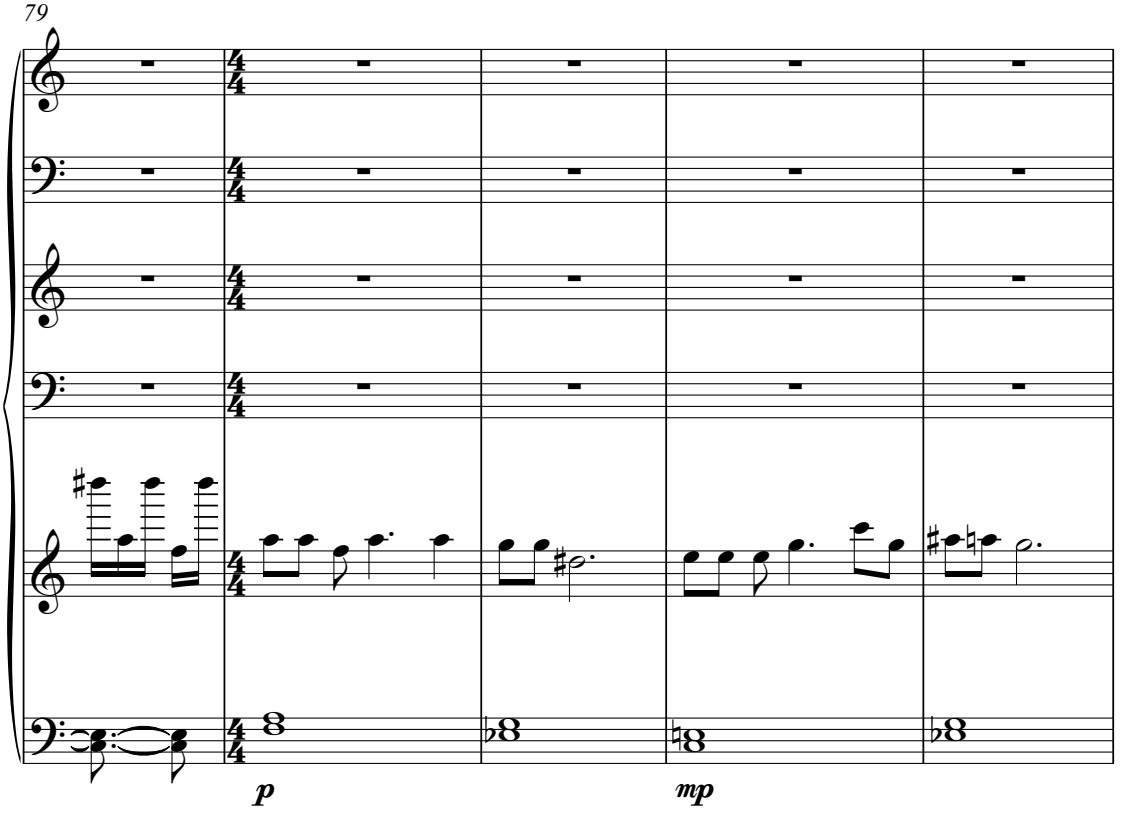

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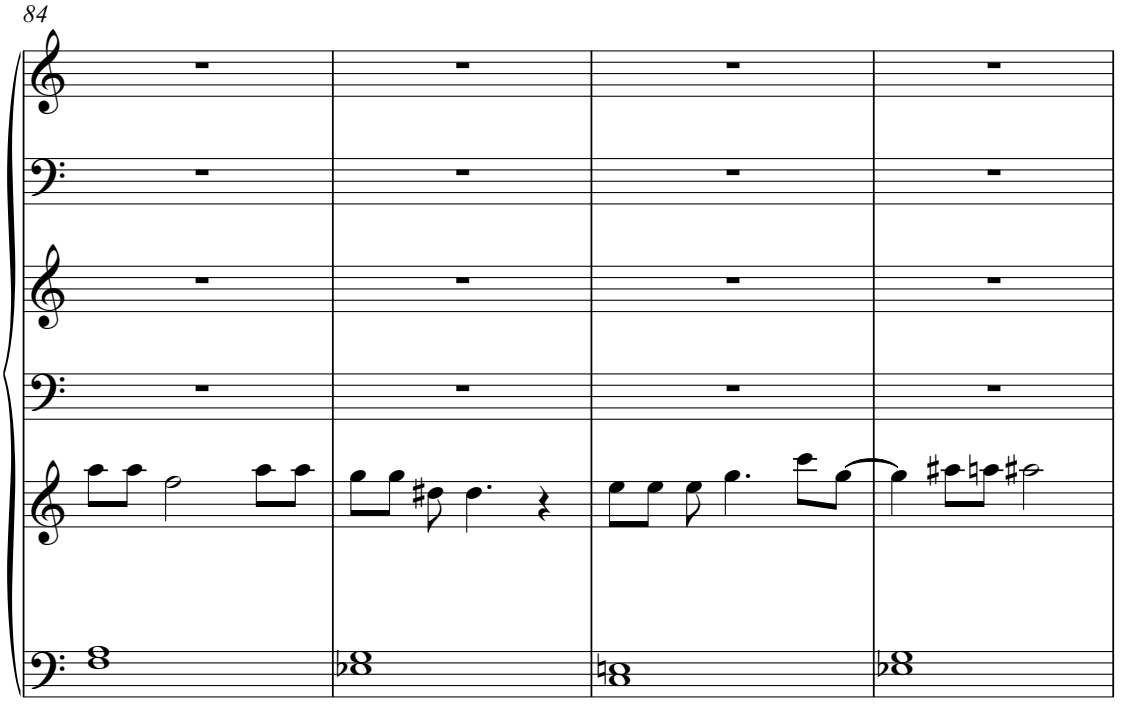

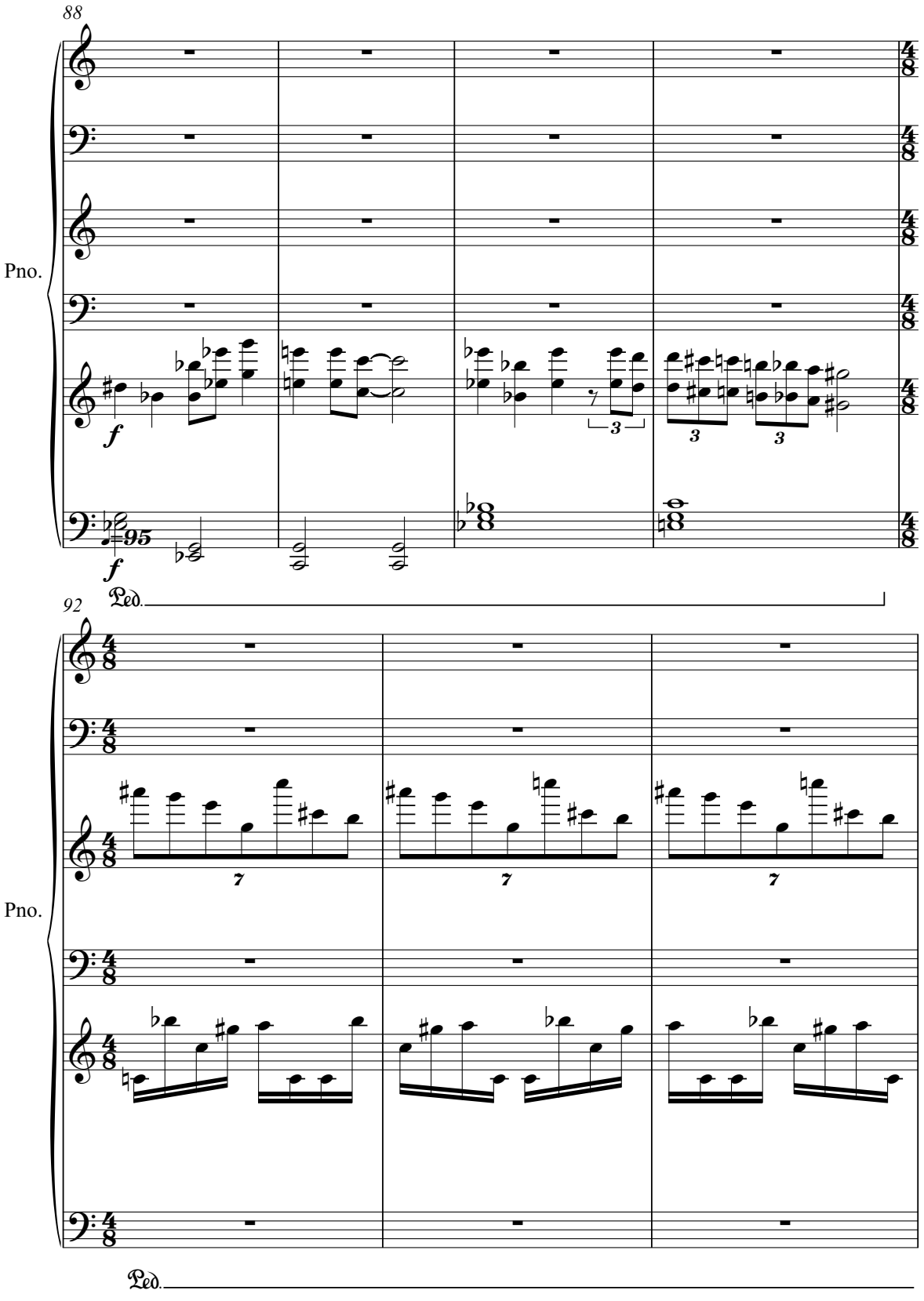
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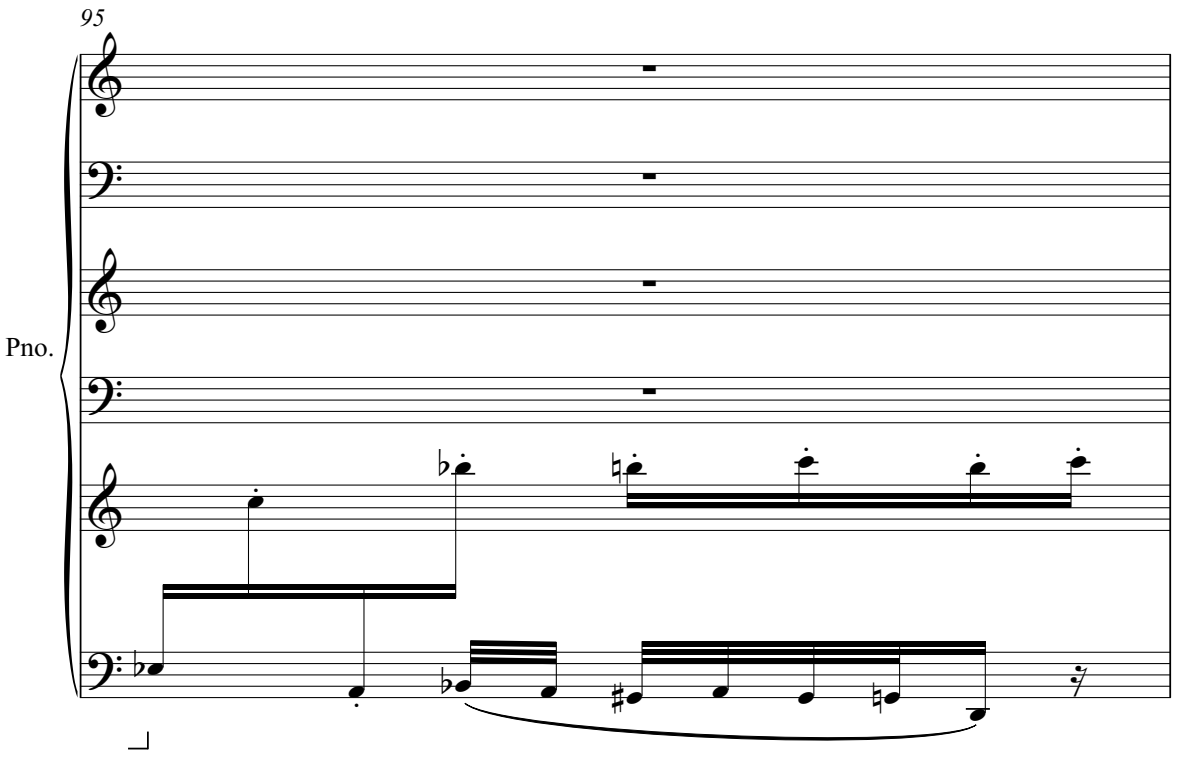

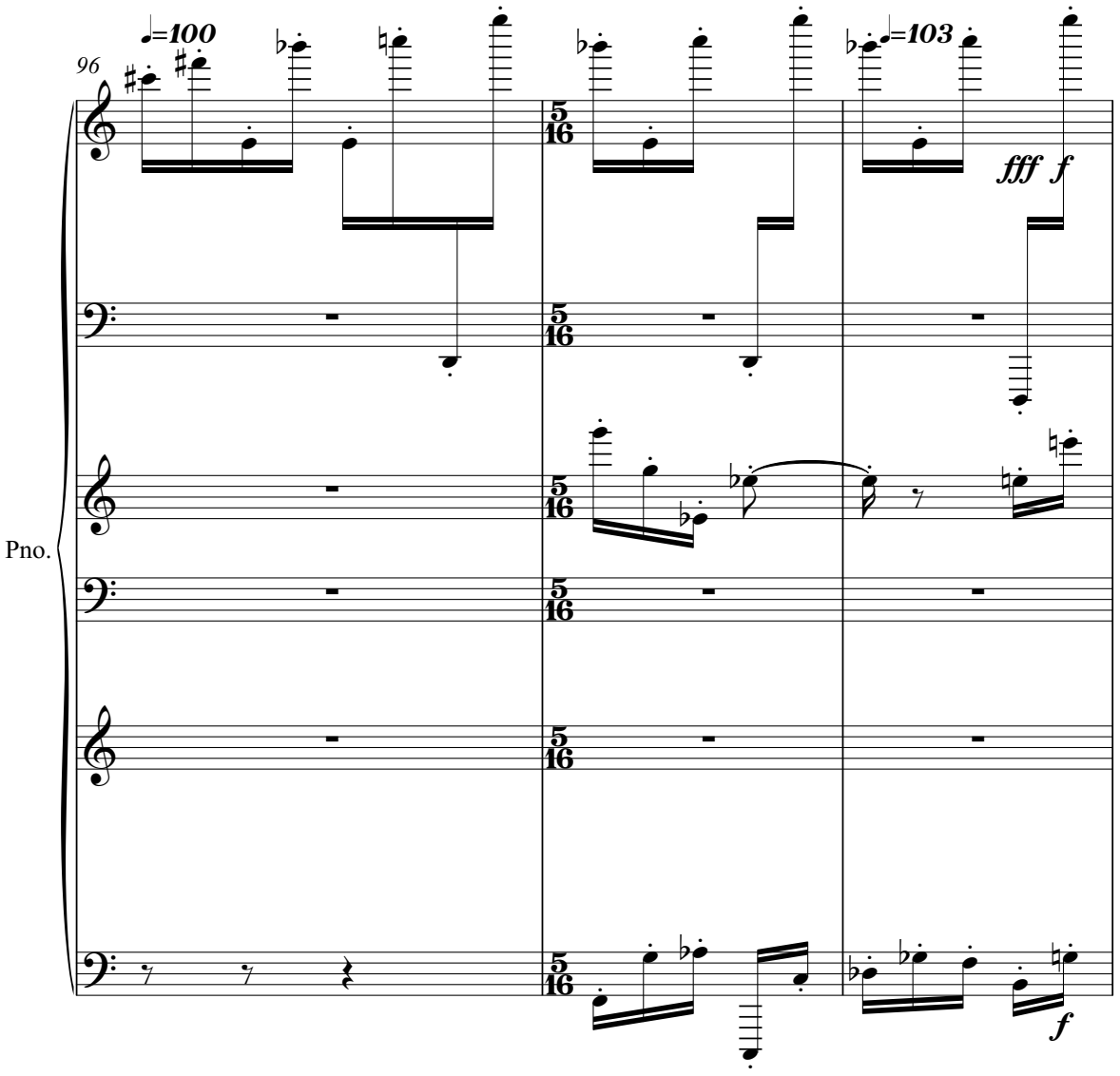
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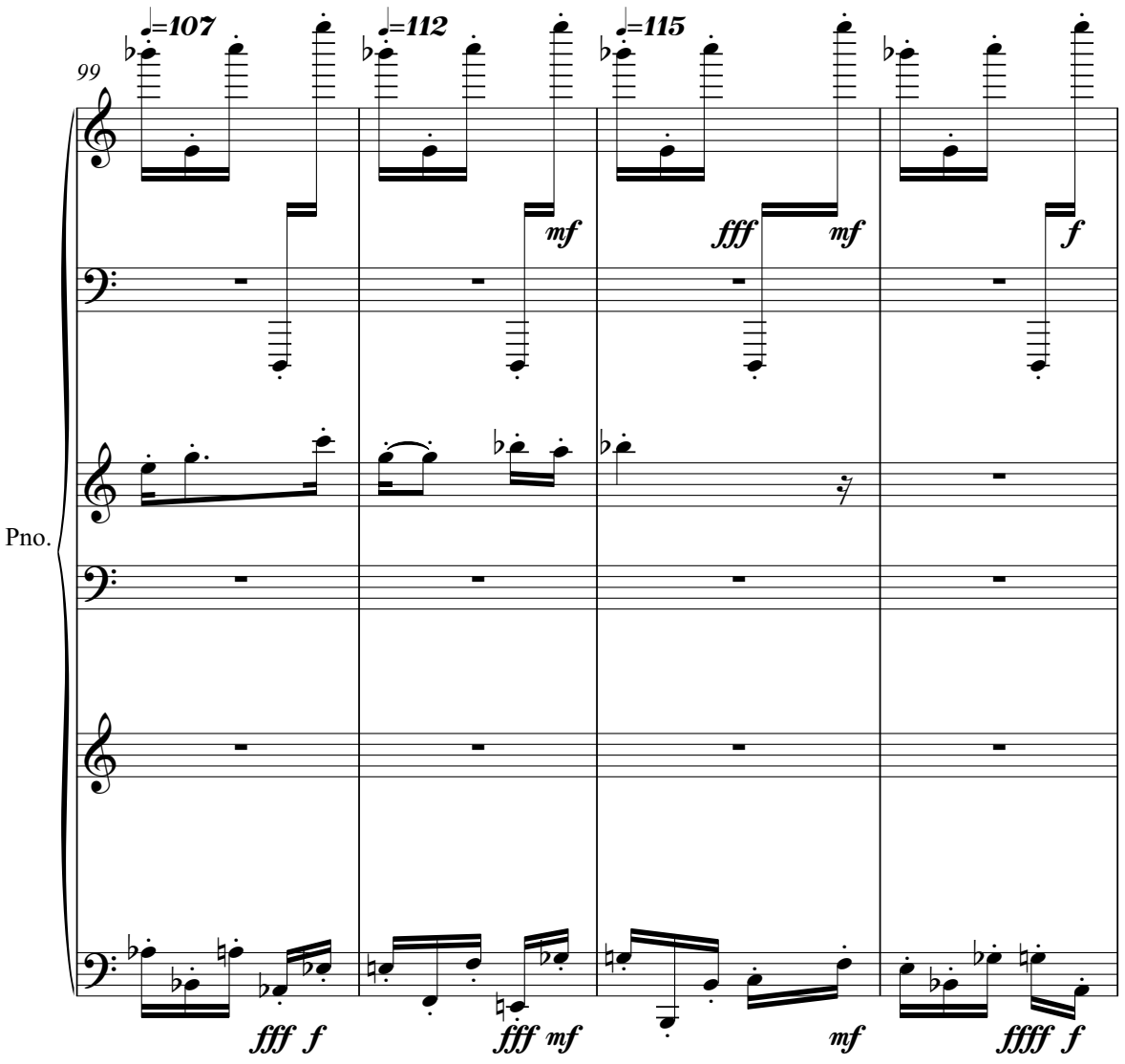

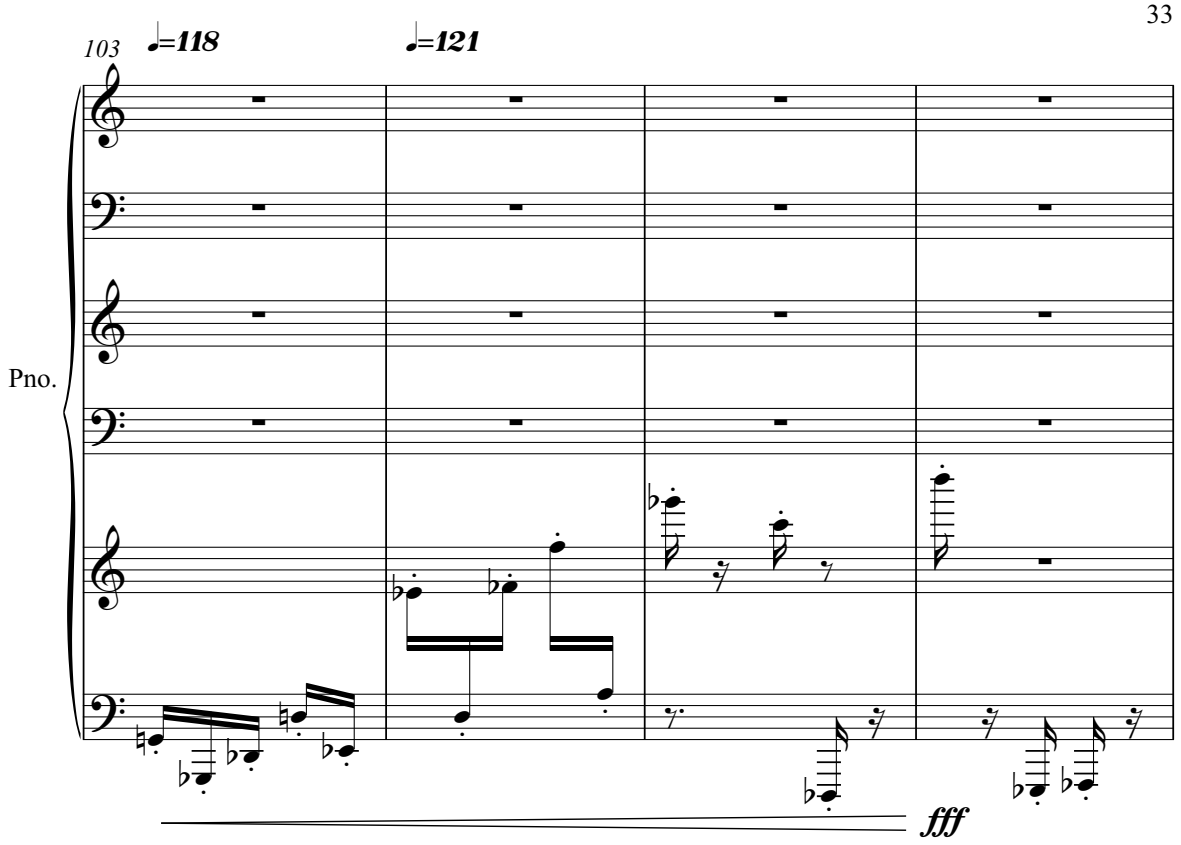
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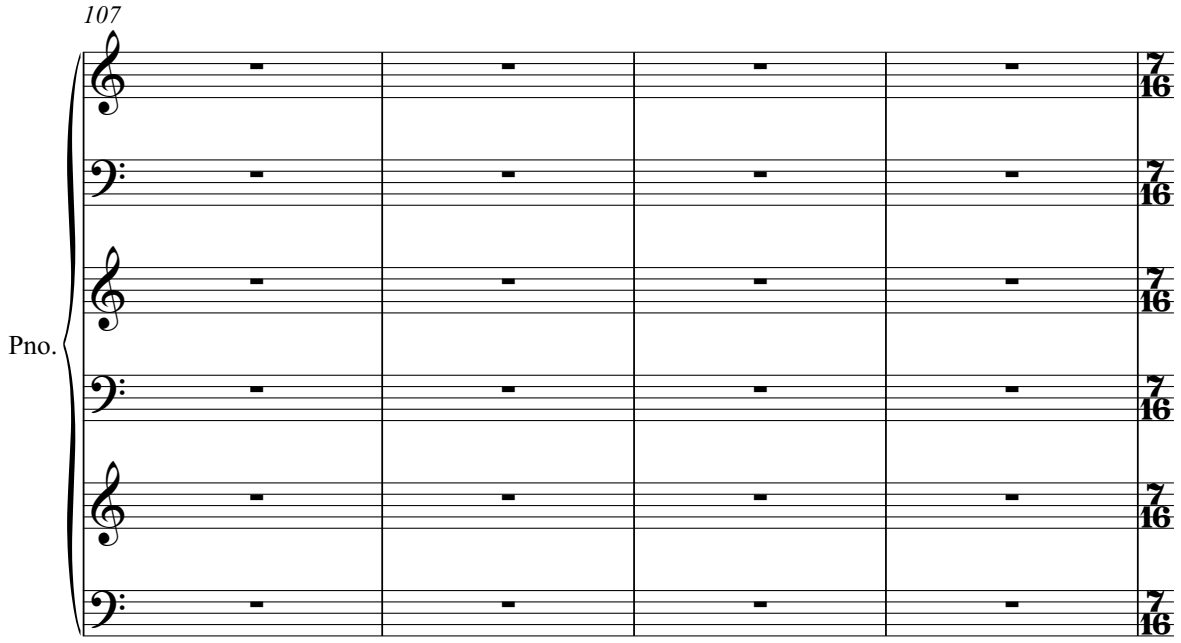
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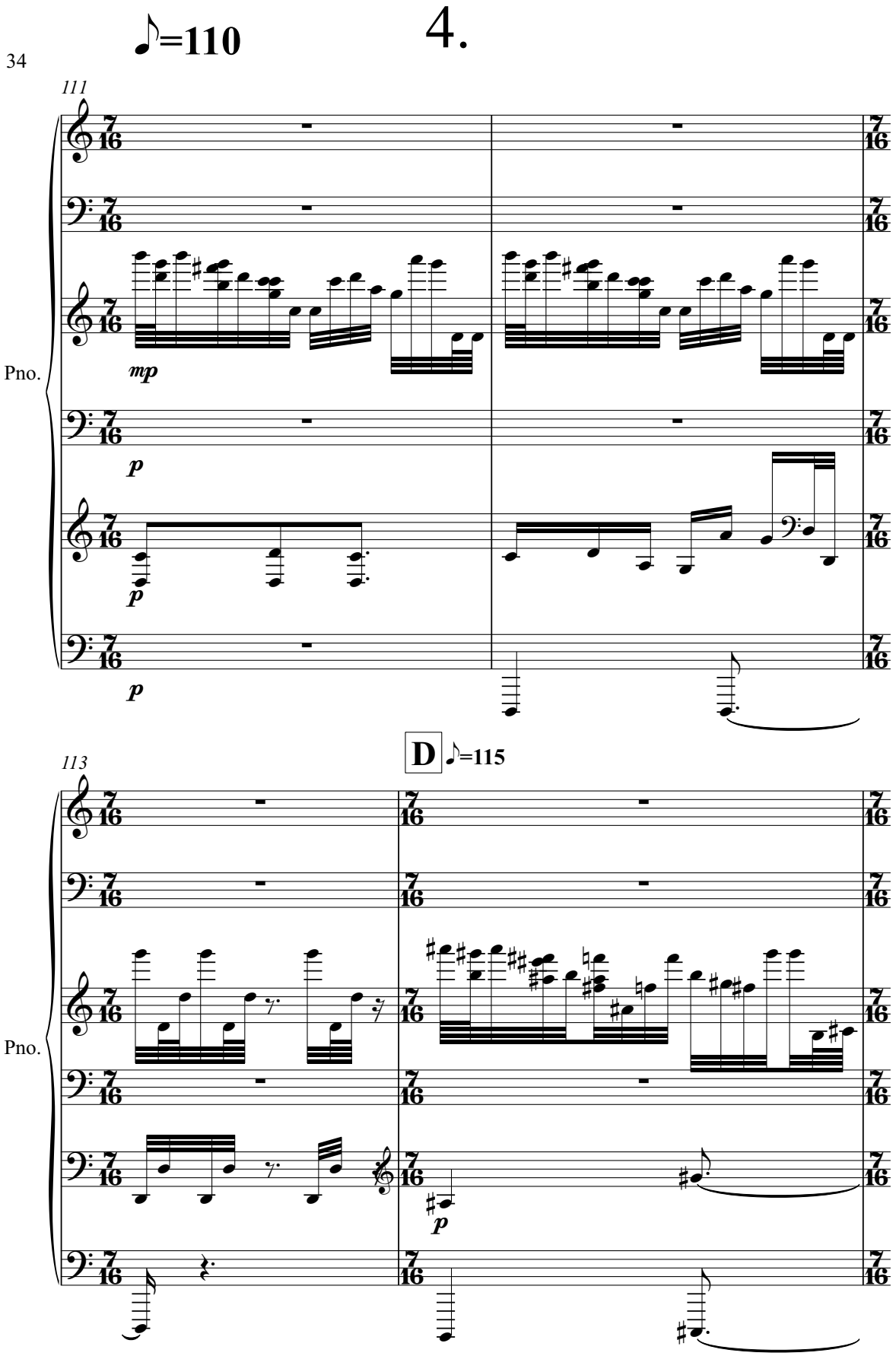
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Pno.

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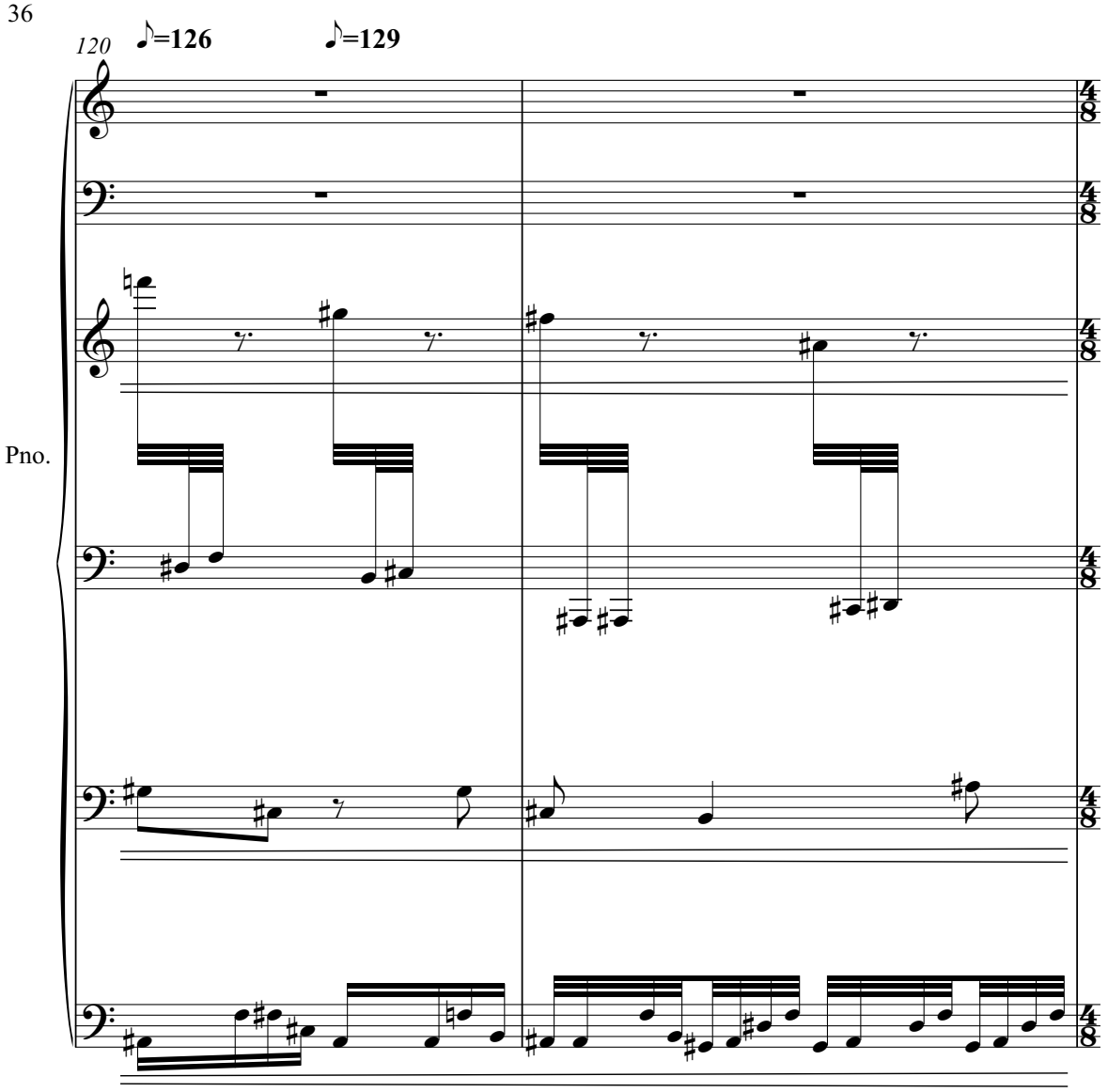

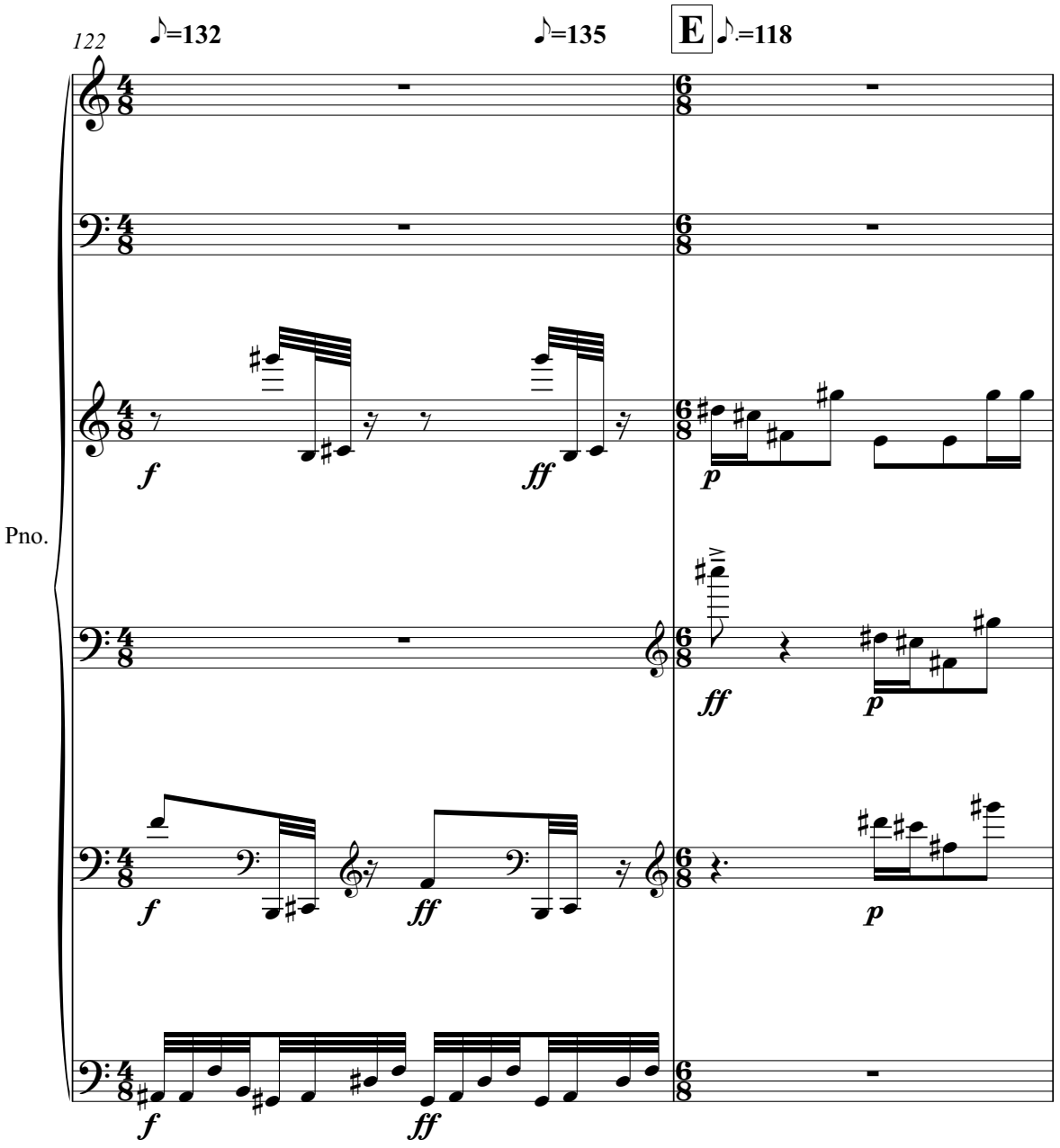
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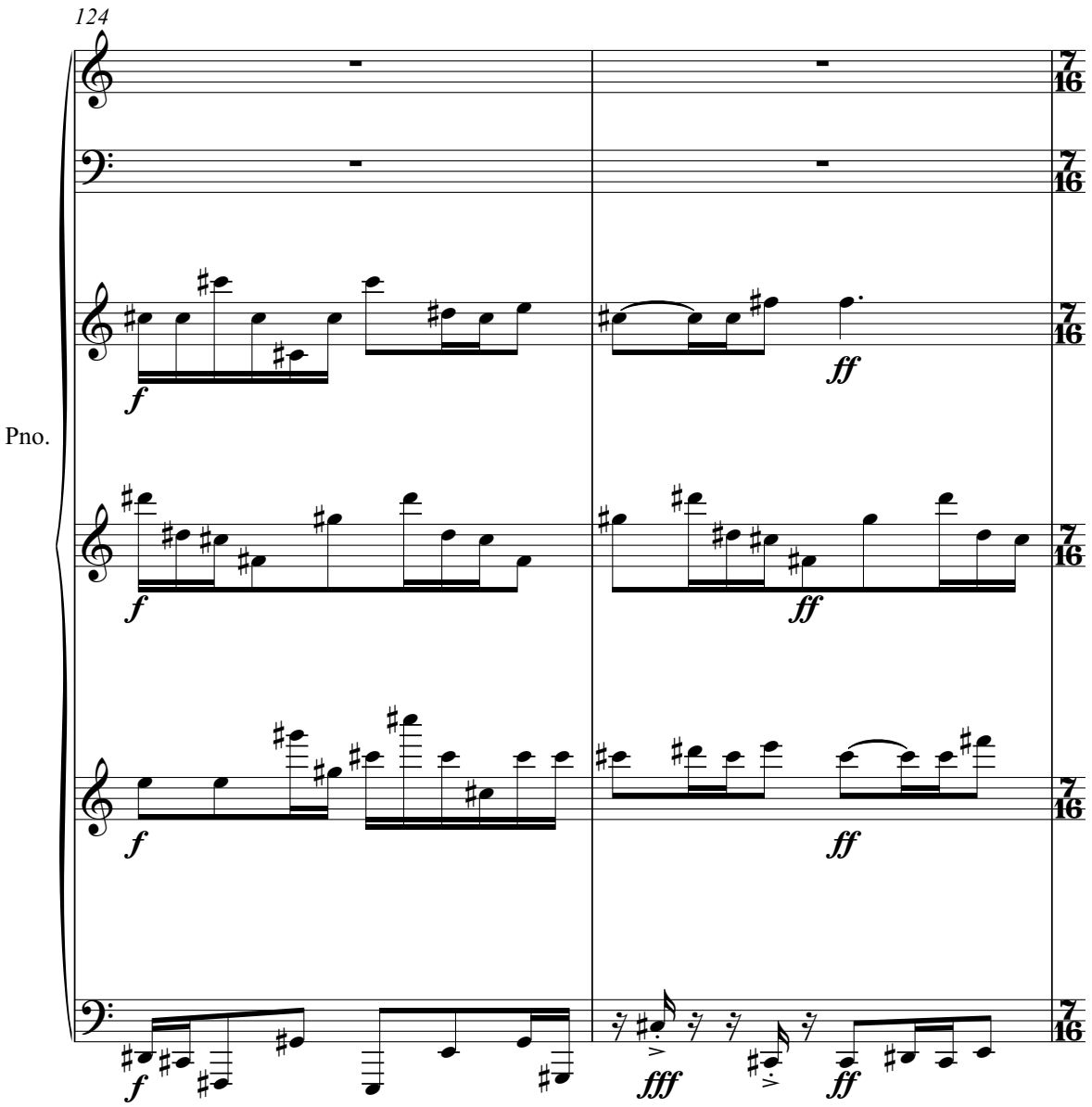
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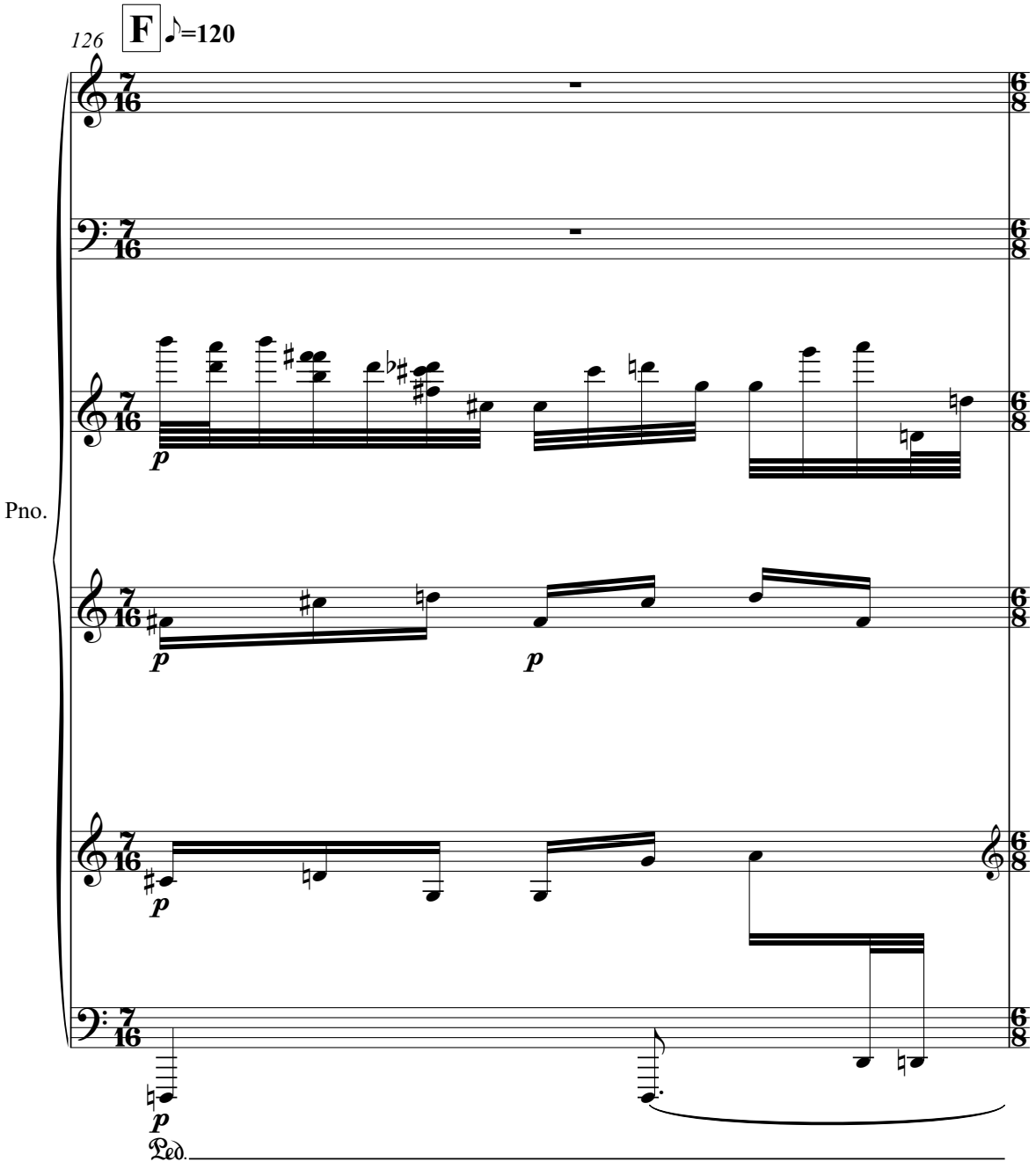
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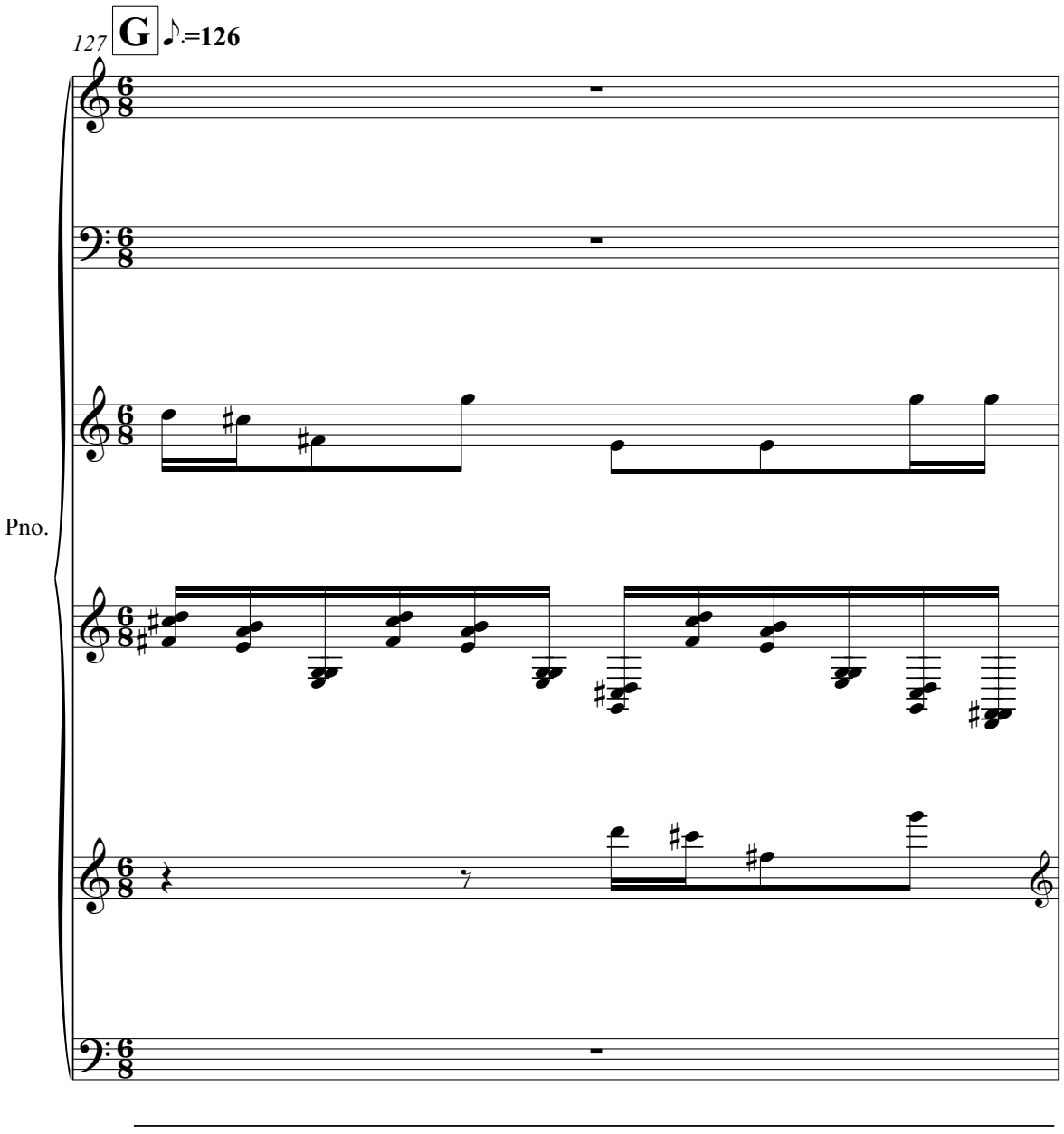
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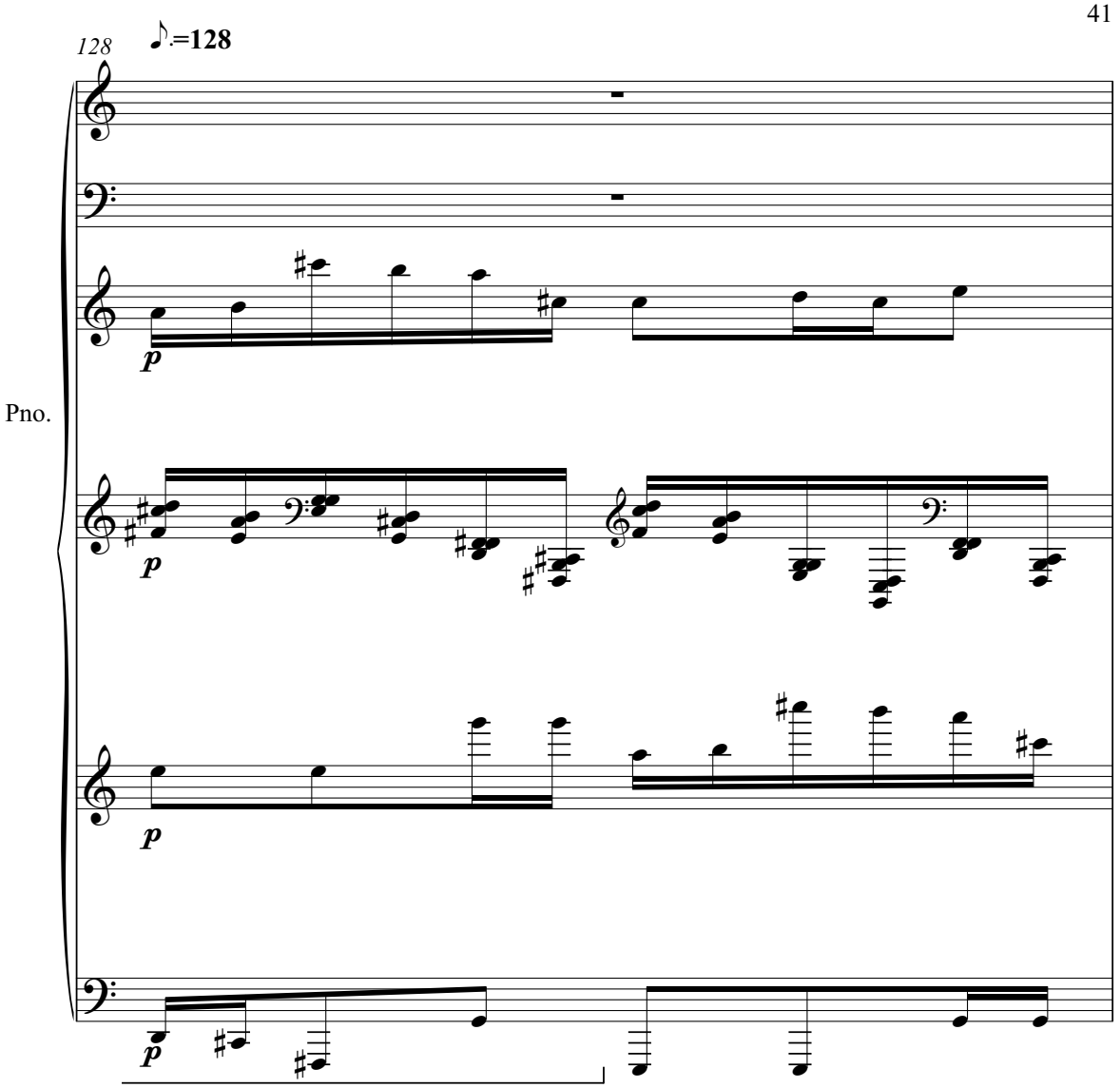
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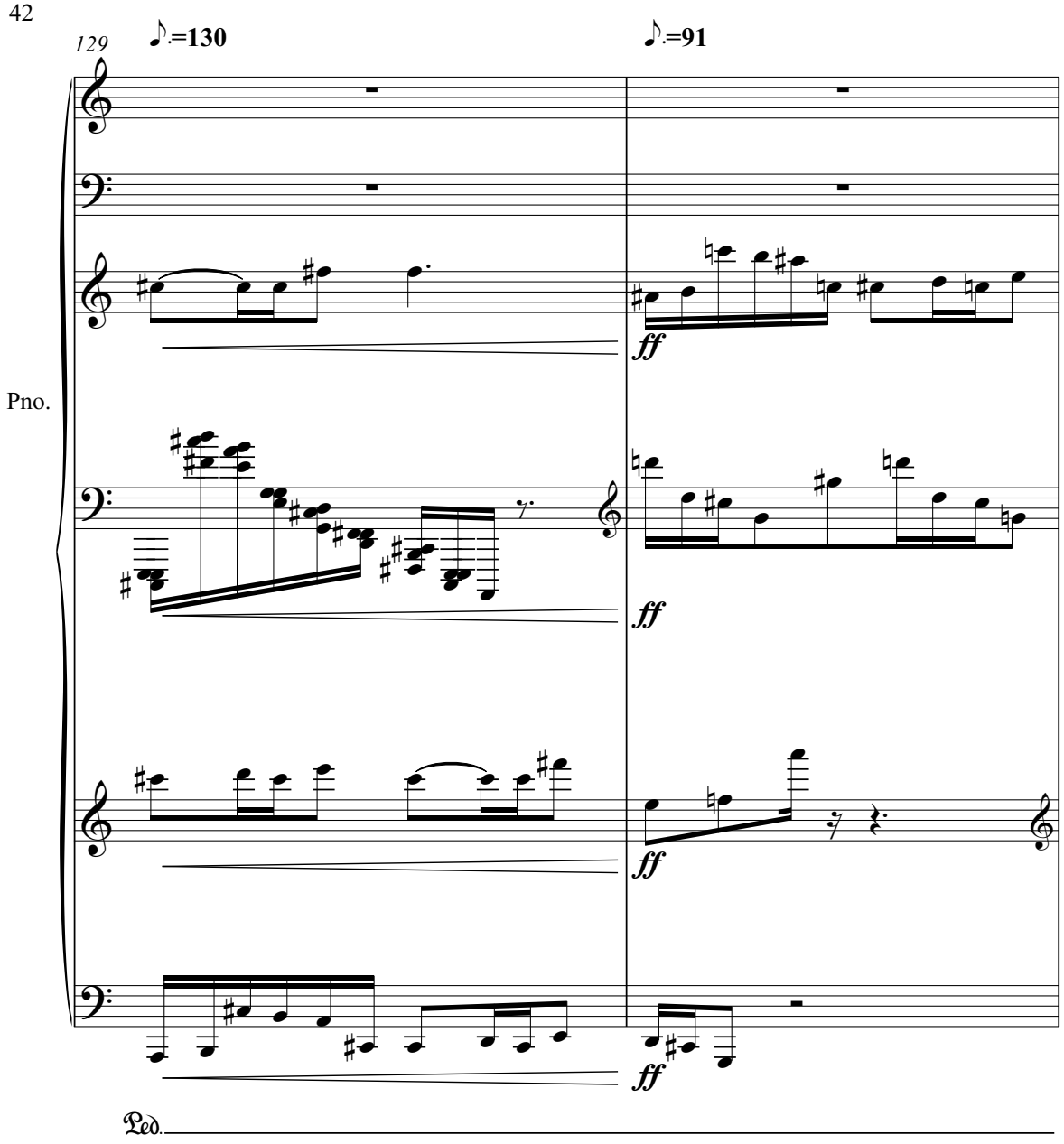

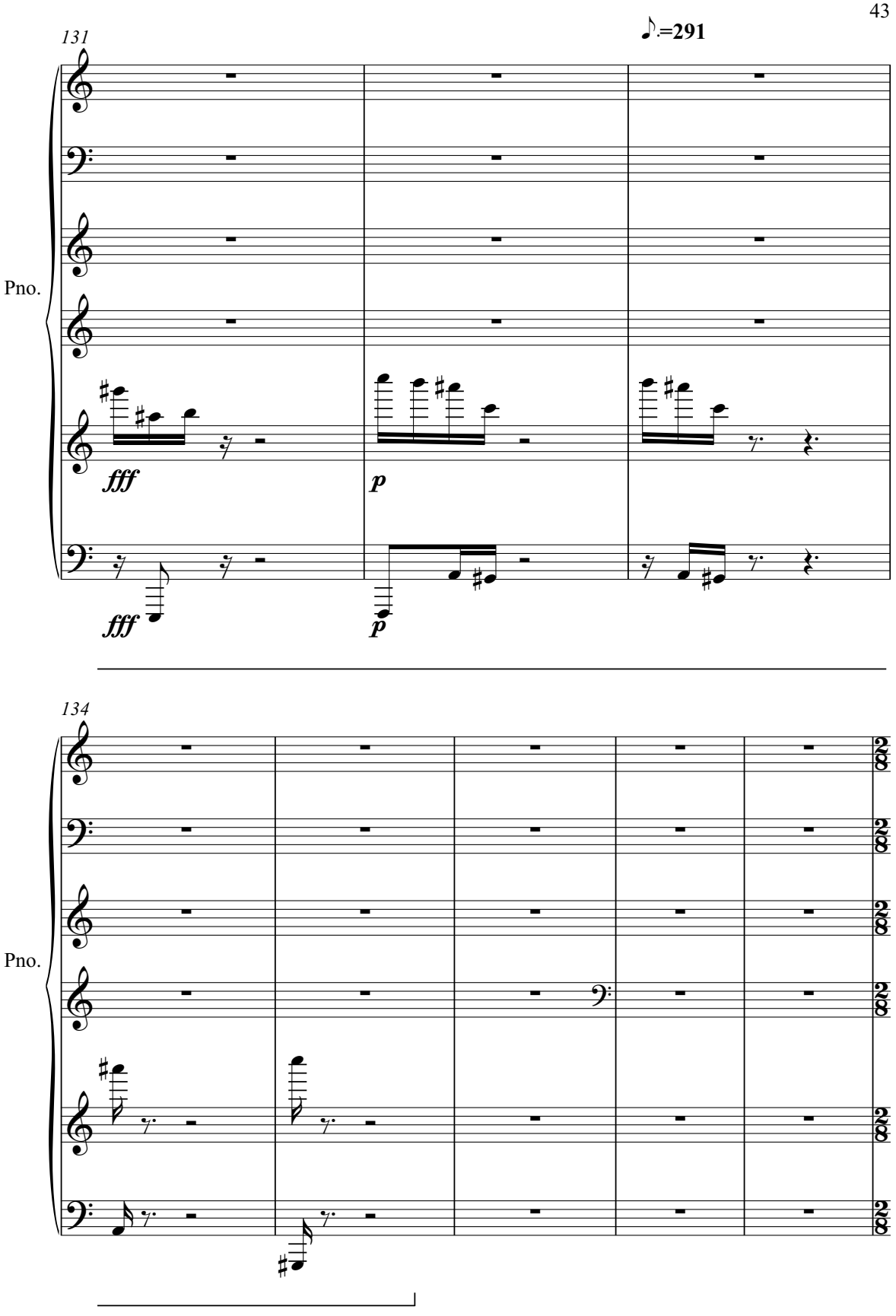
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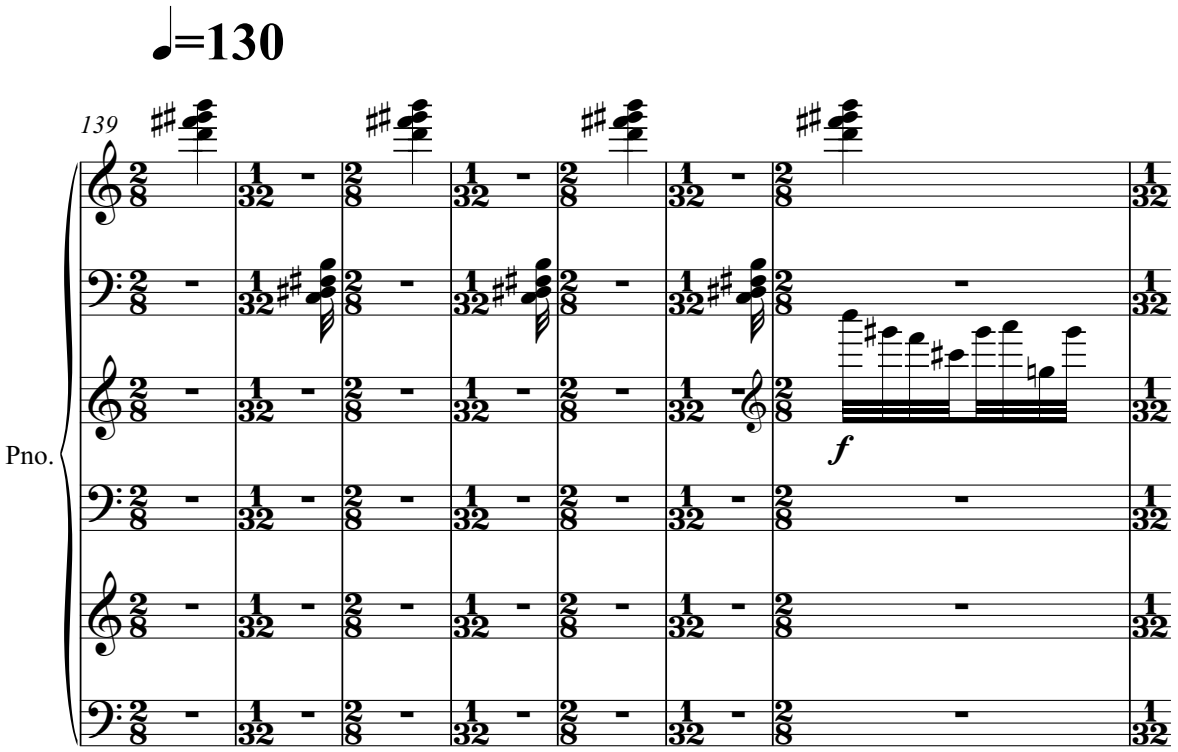

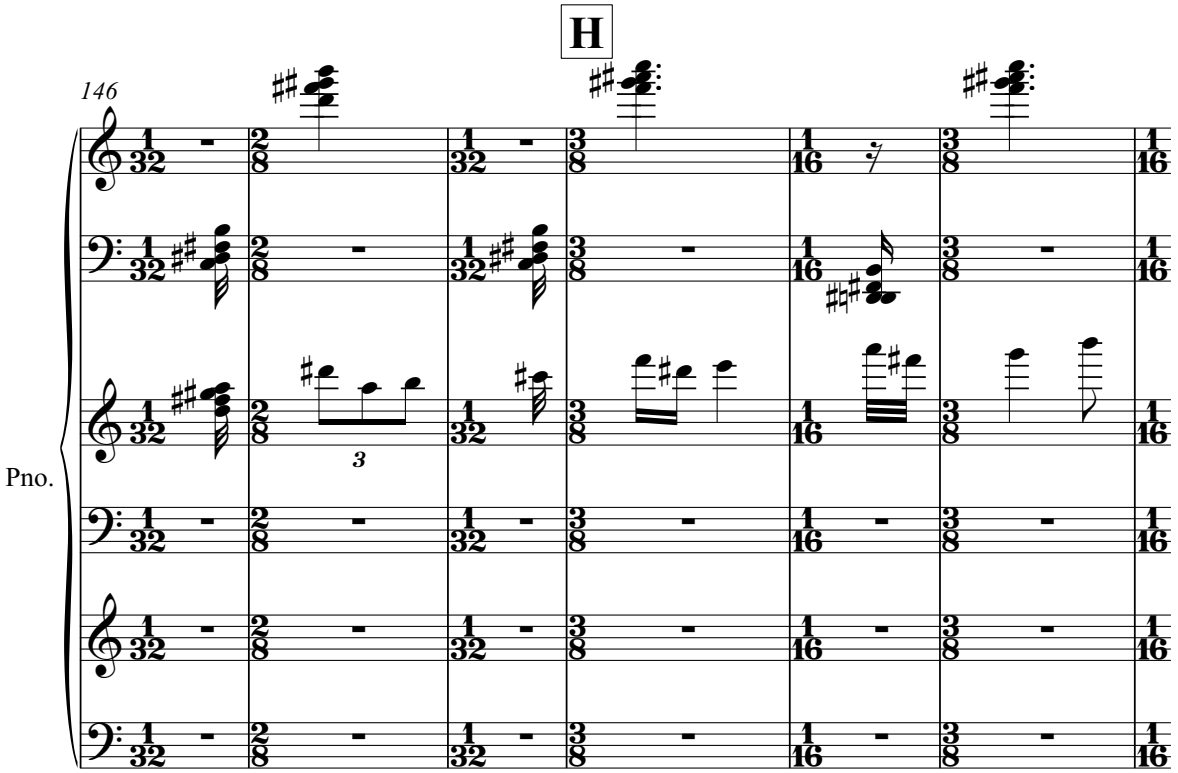
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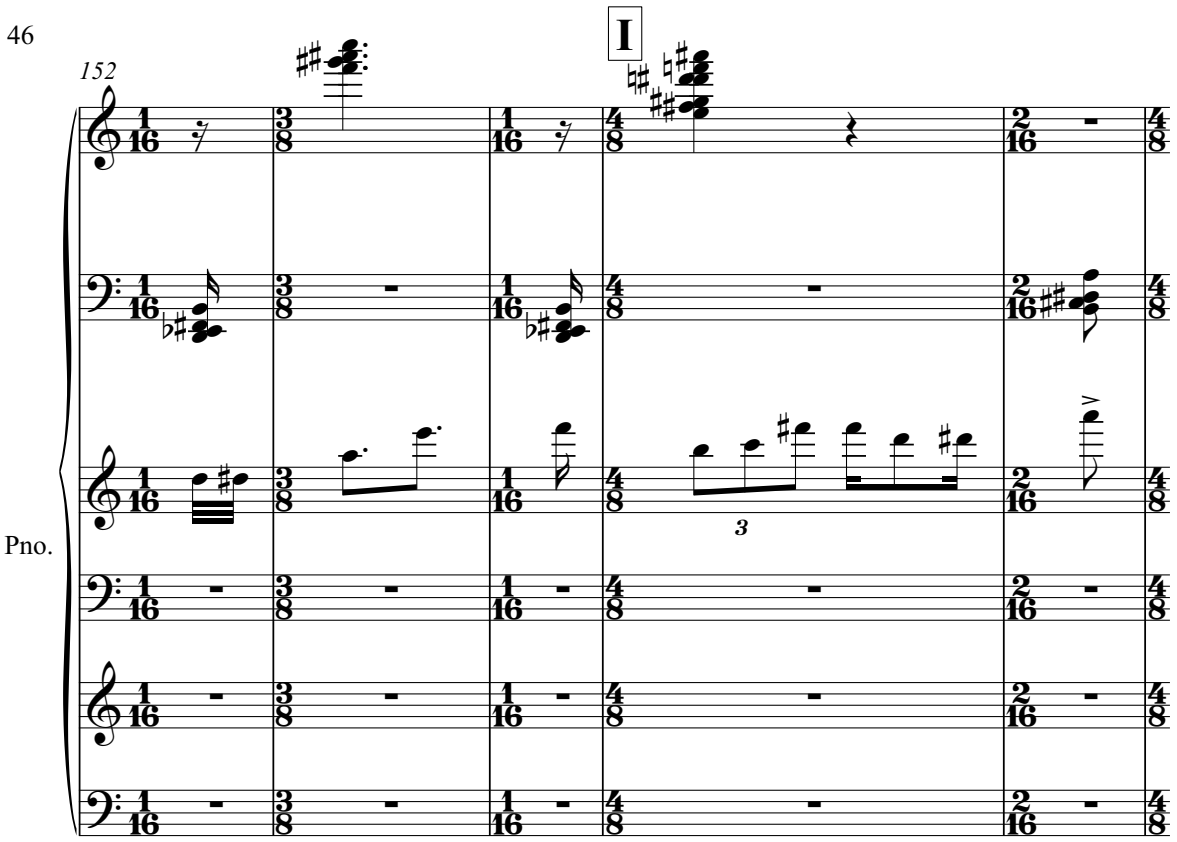

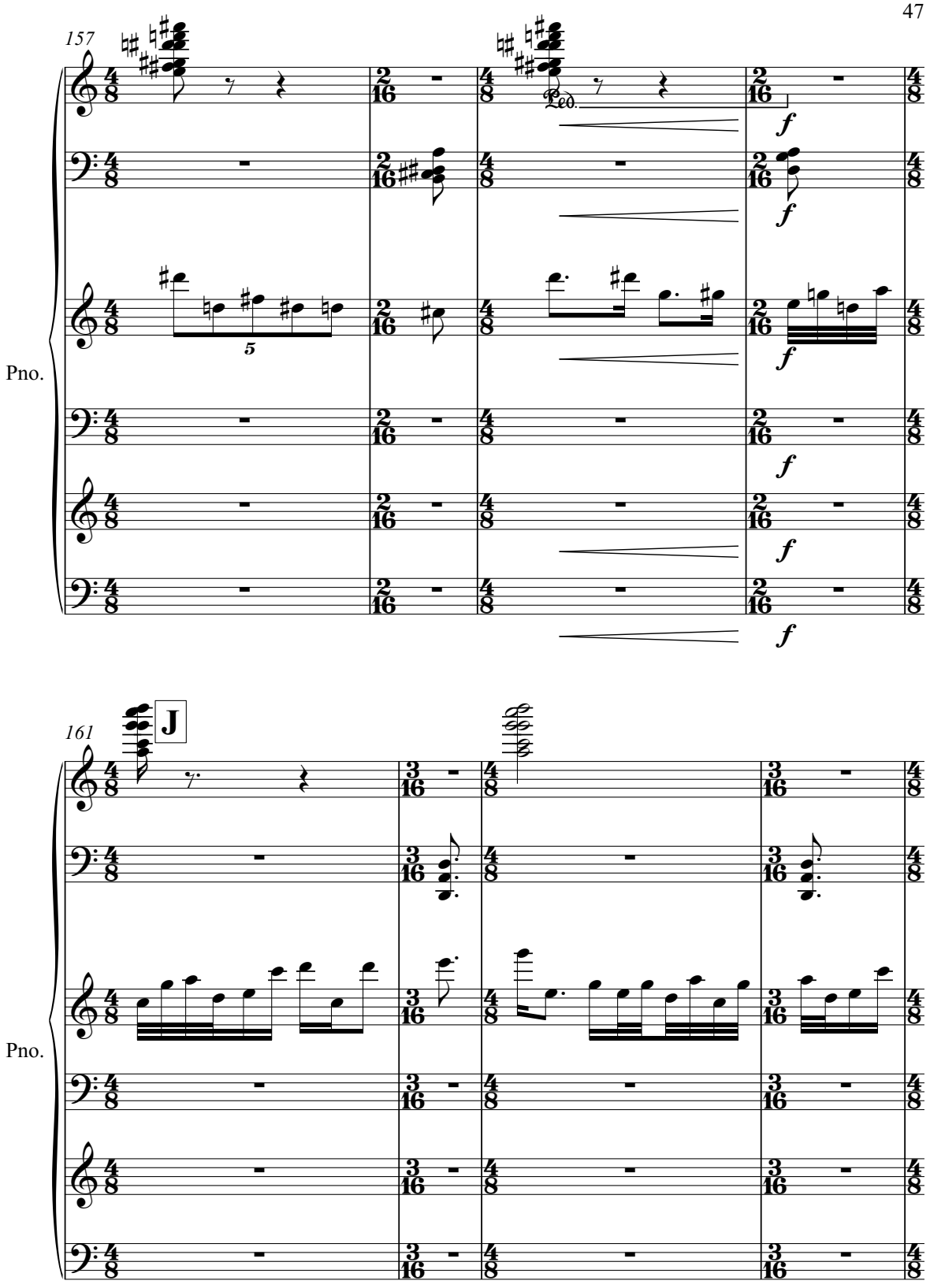
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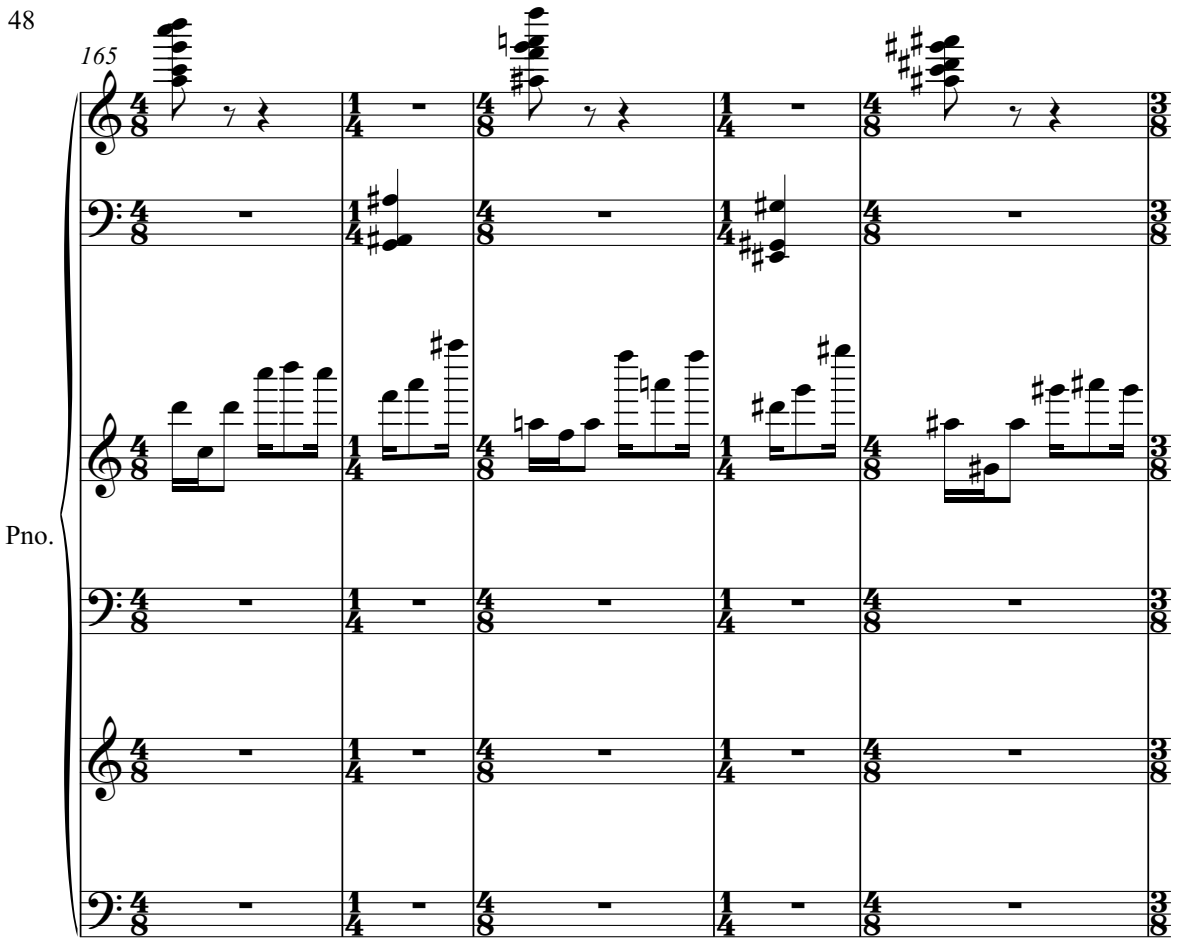

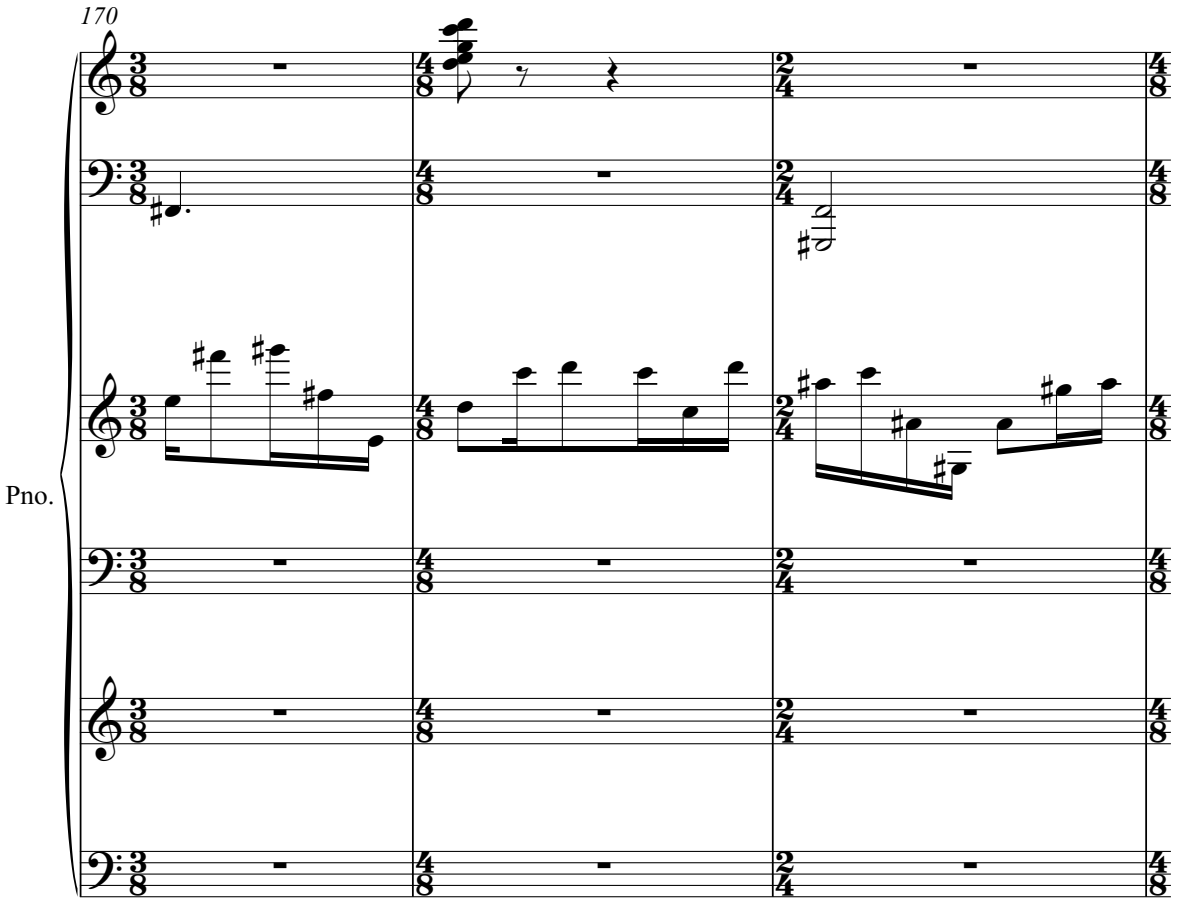
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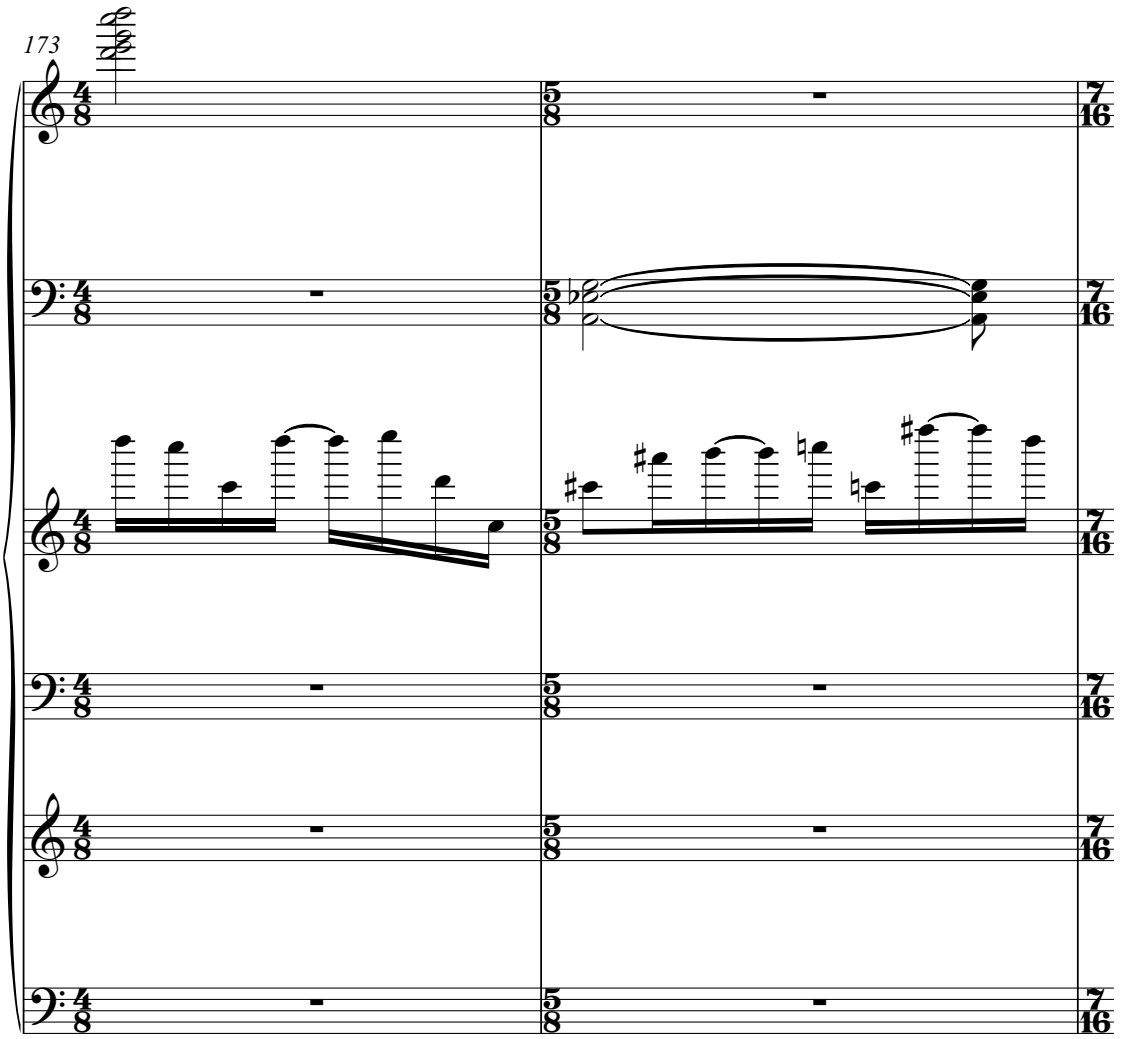

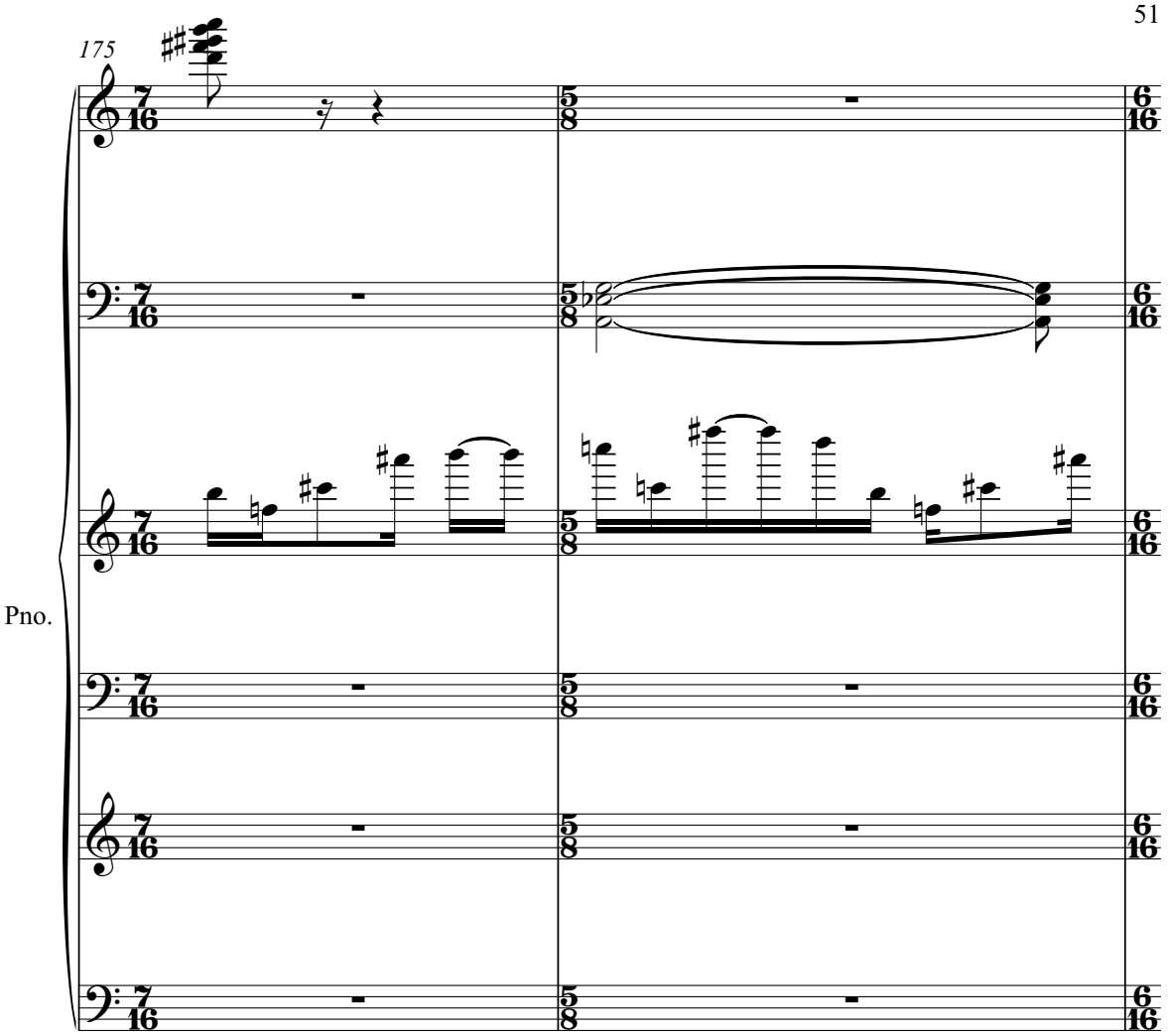
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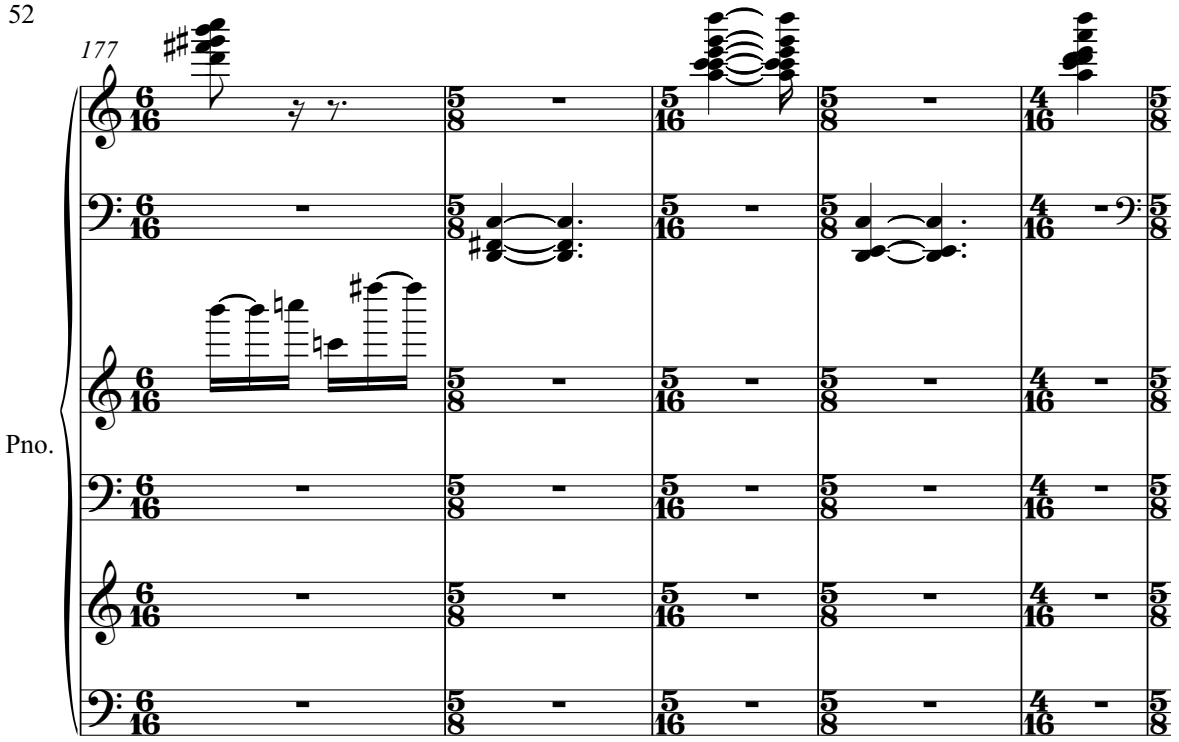

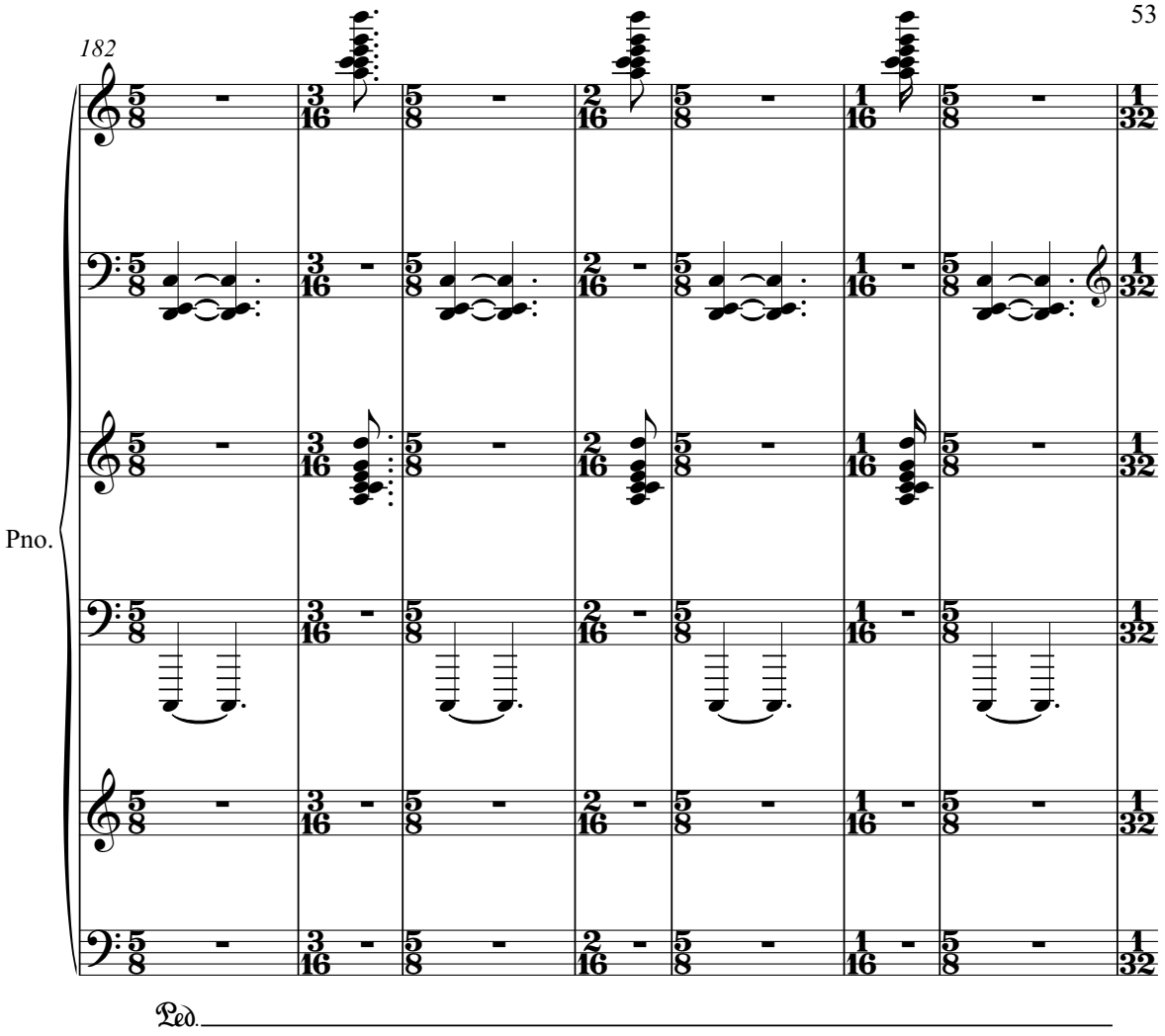
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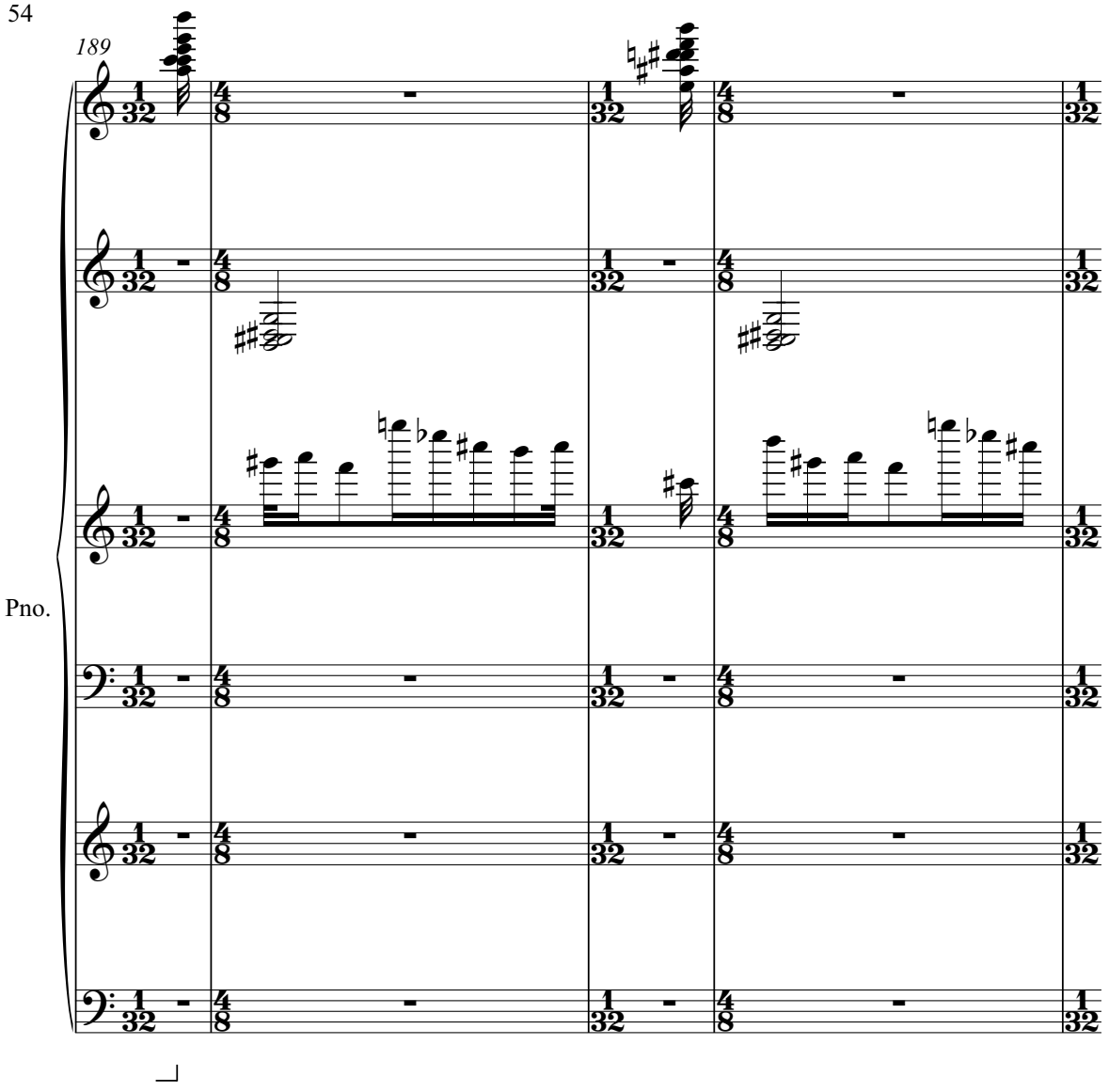

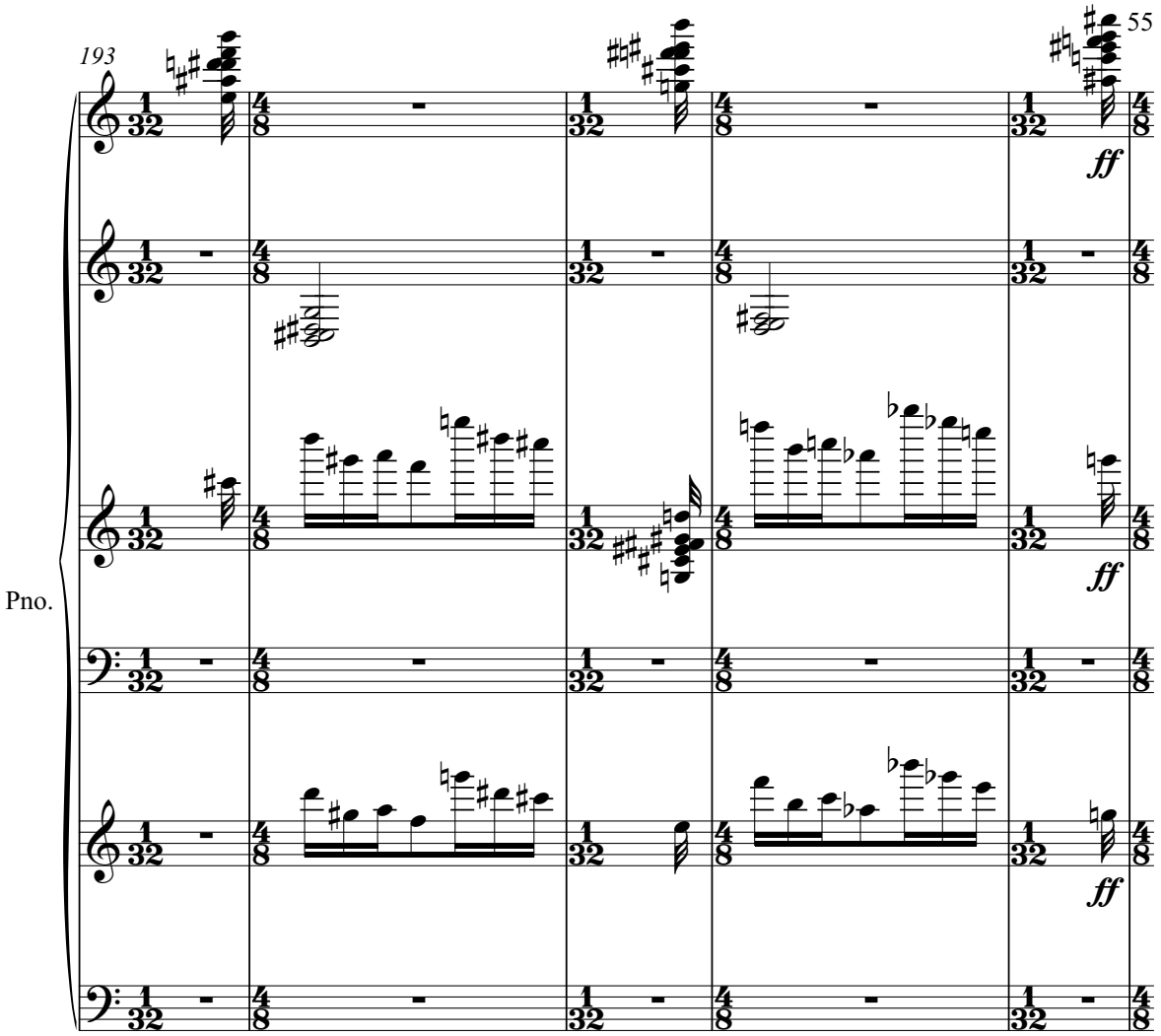
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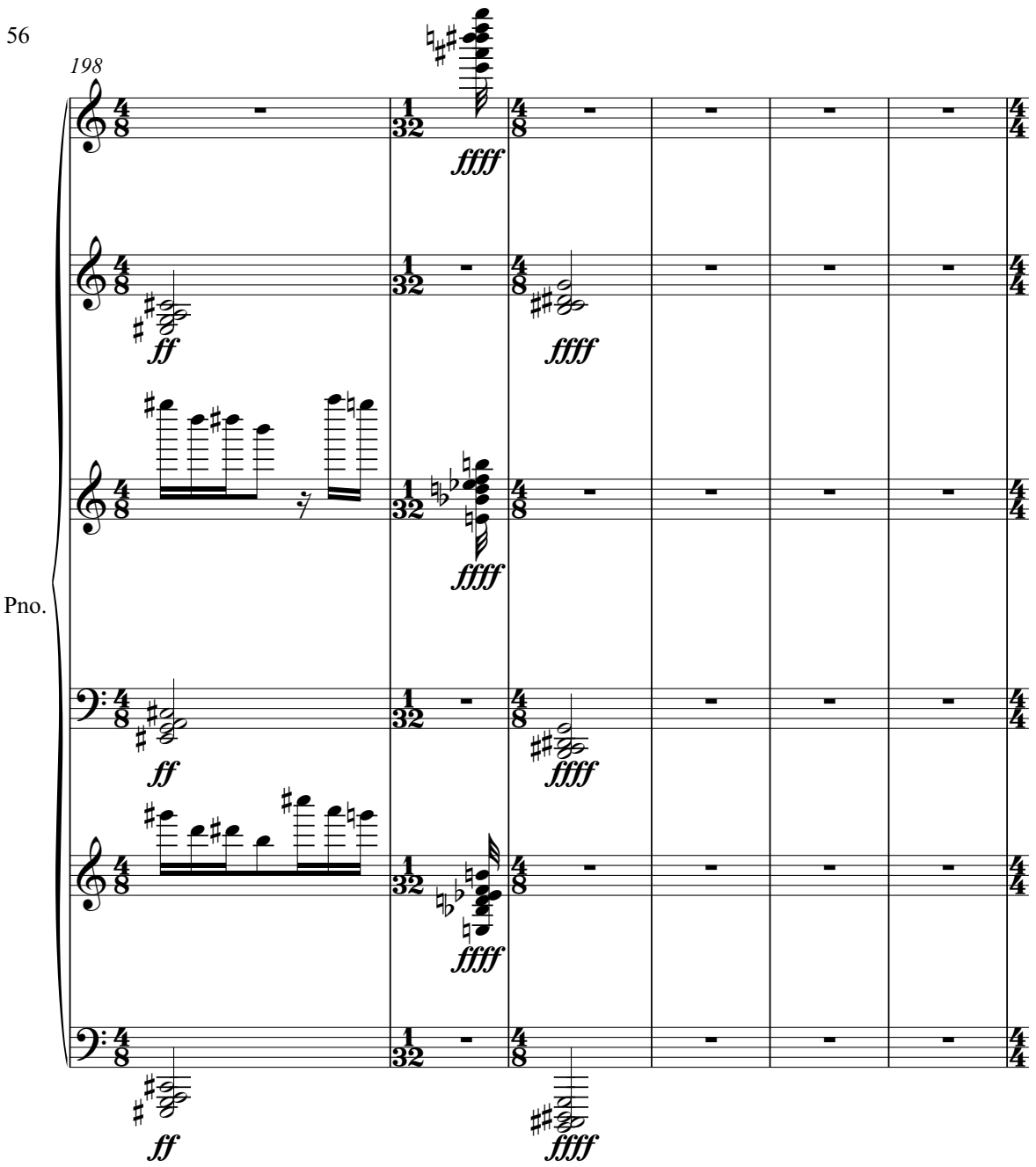
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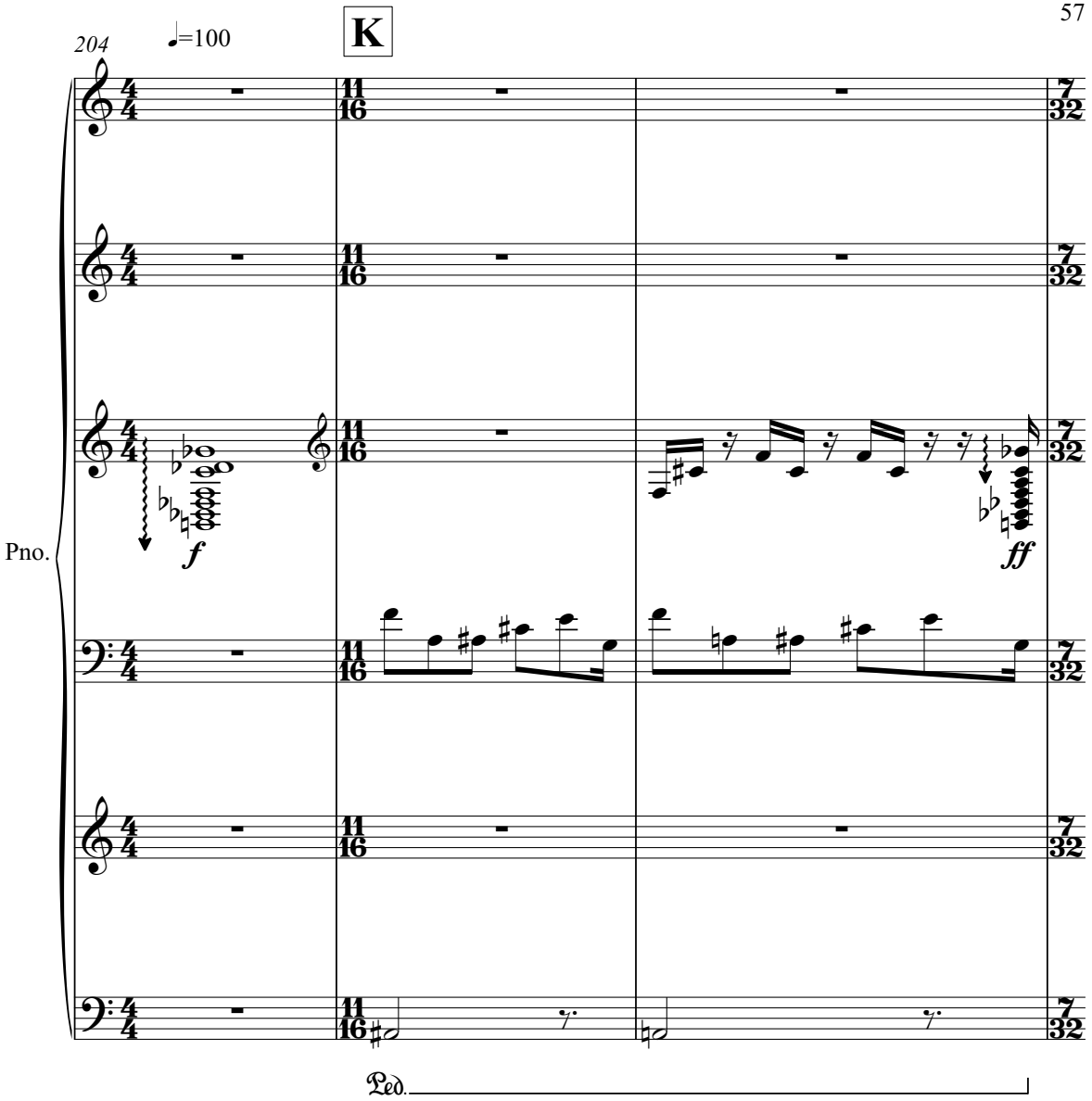

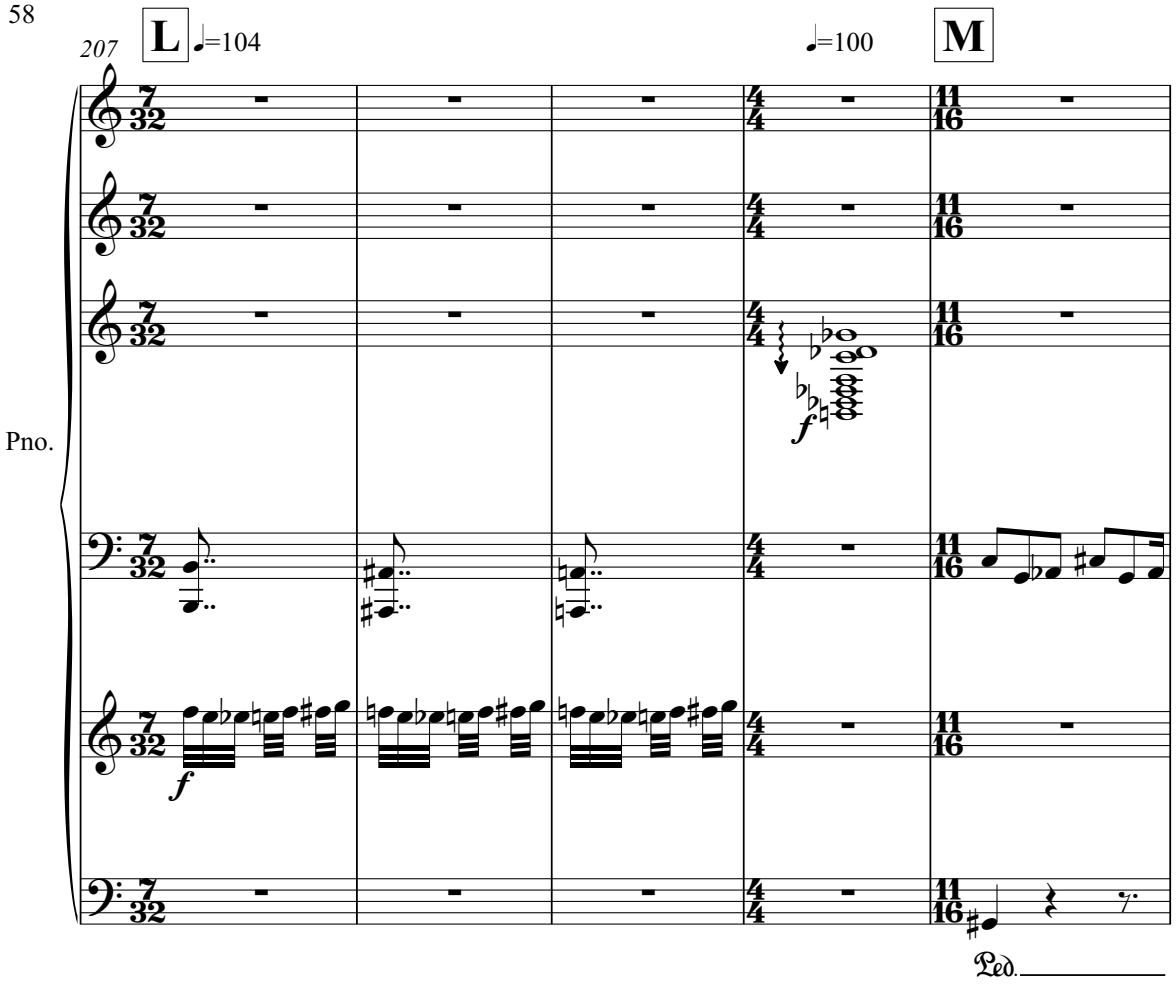
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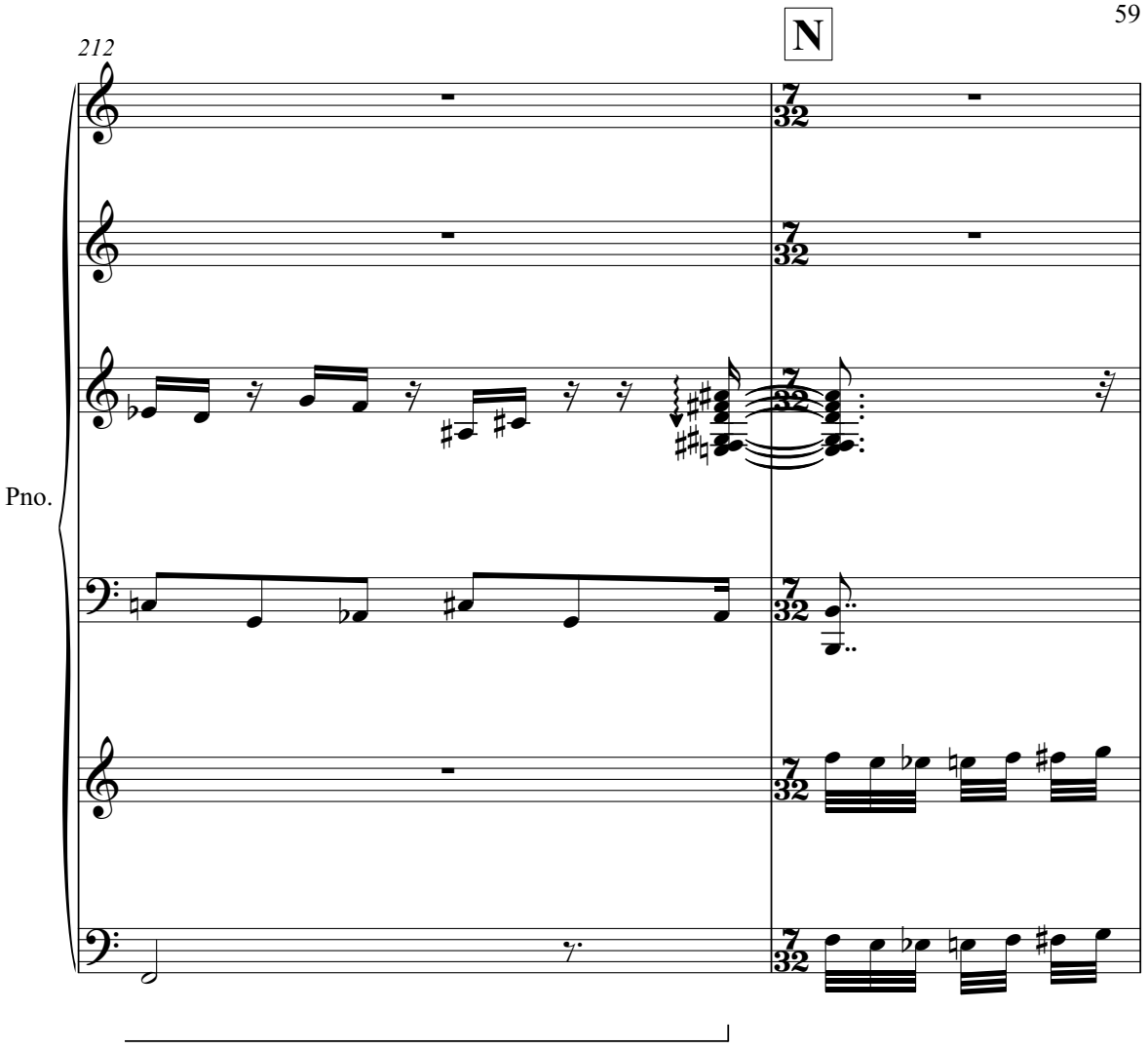
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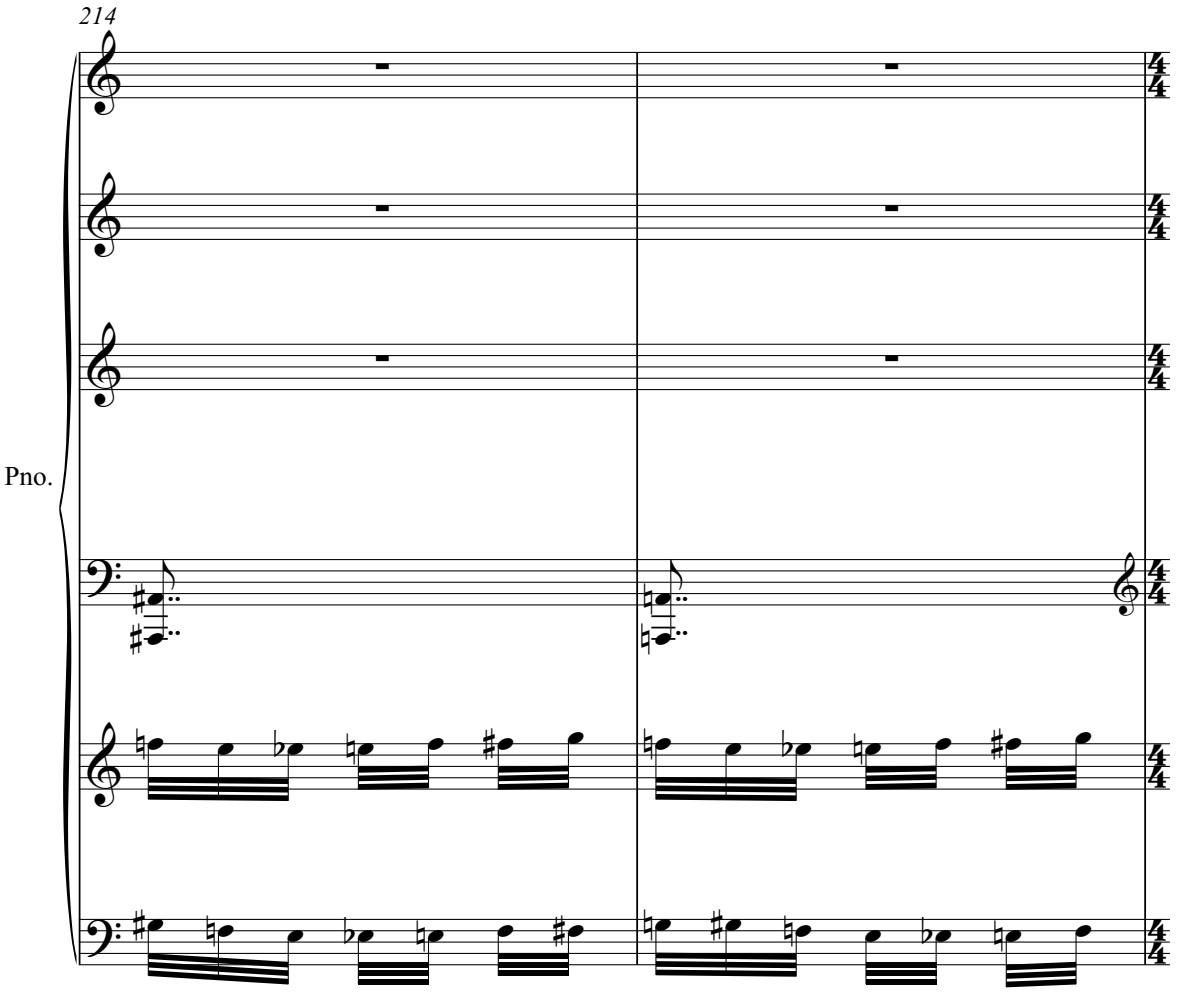

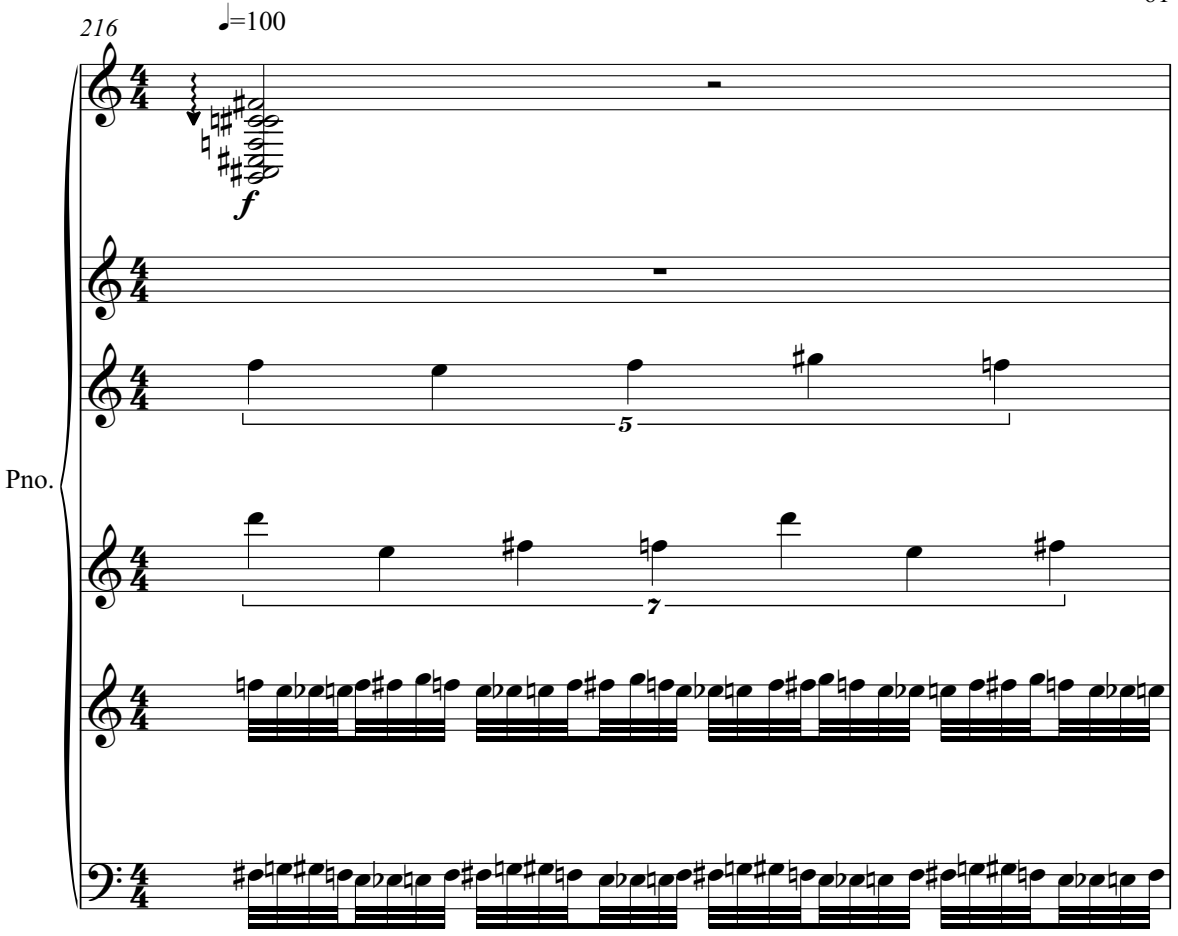
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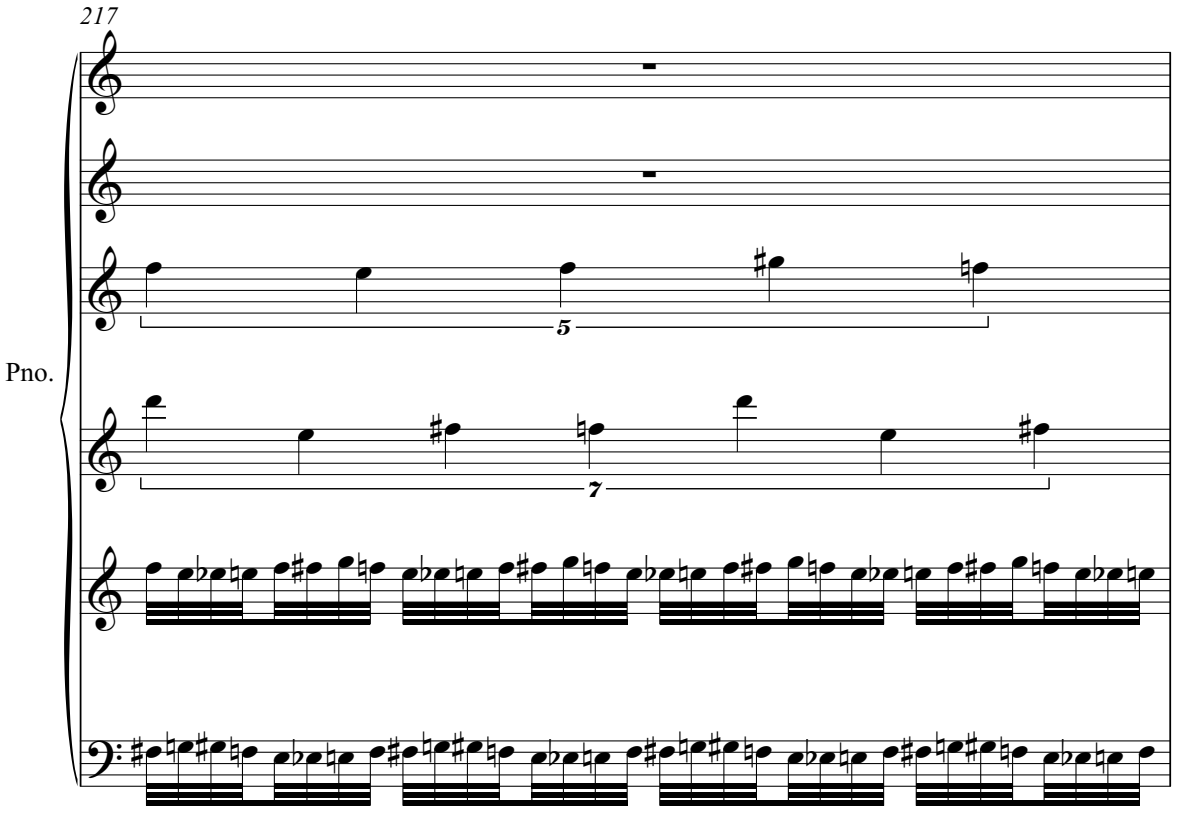

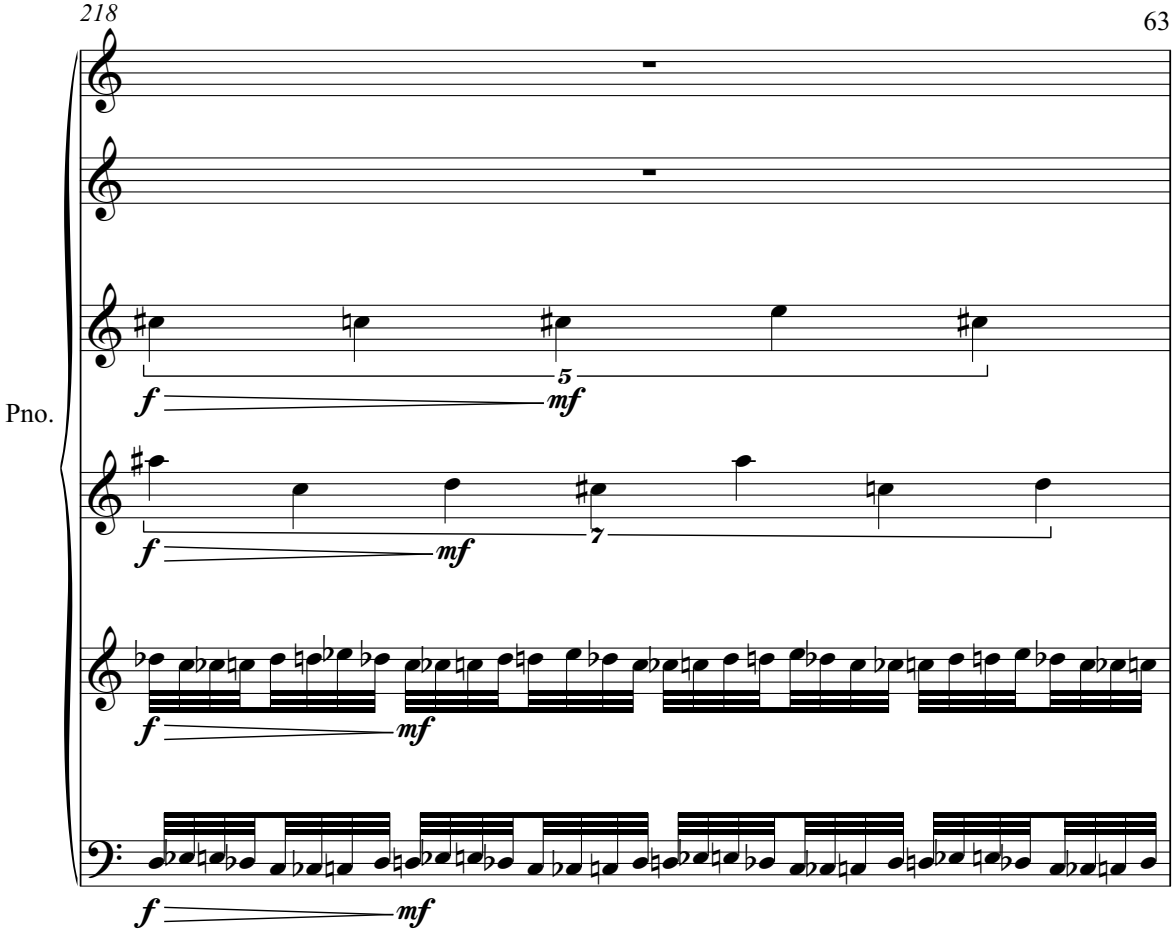
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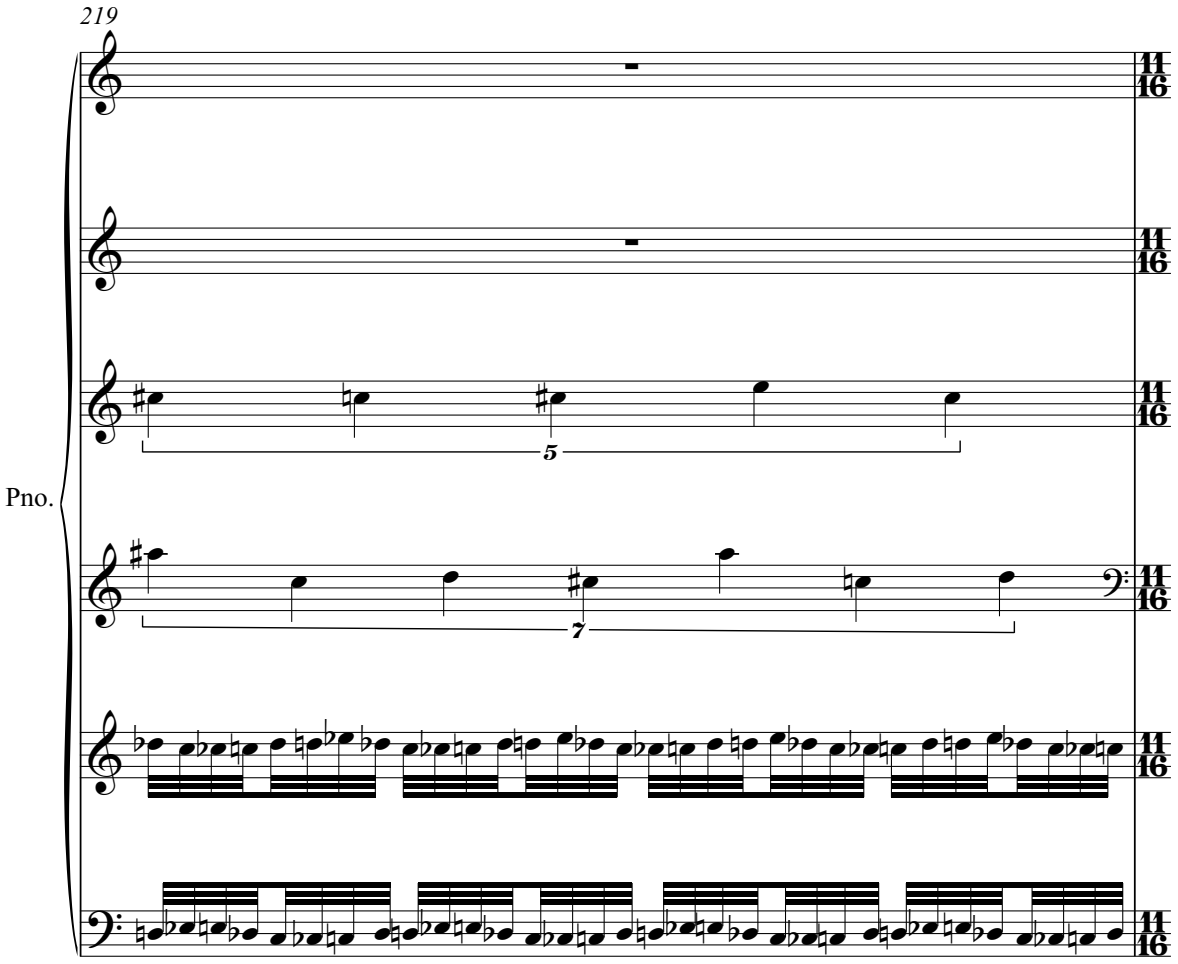
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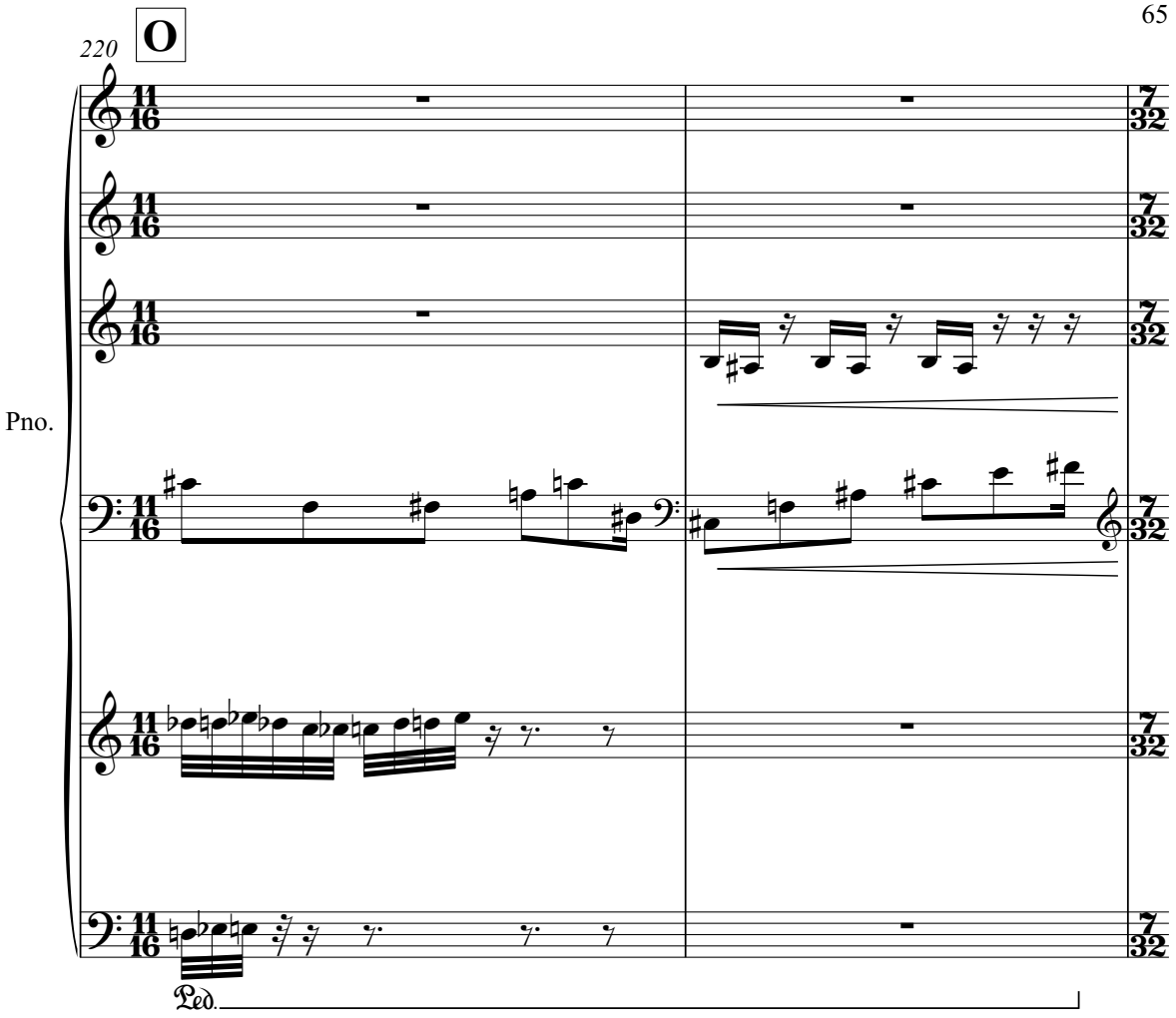
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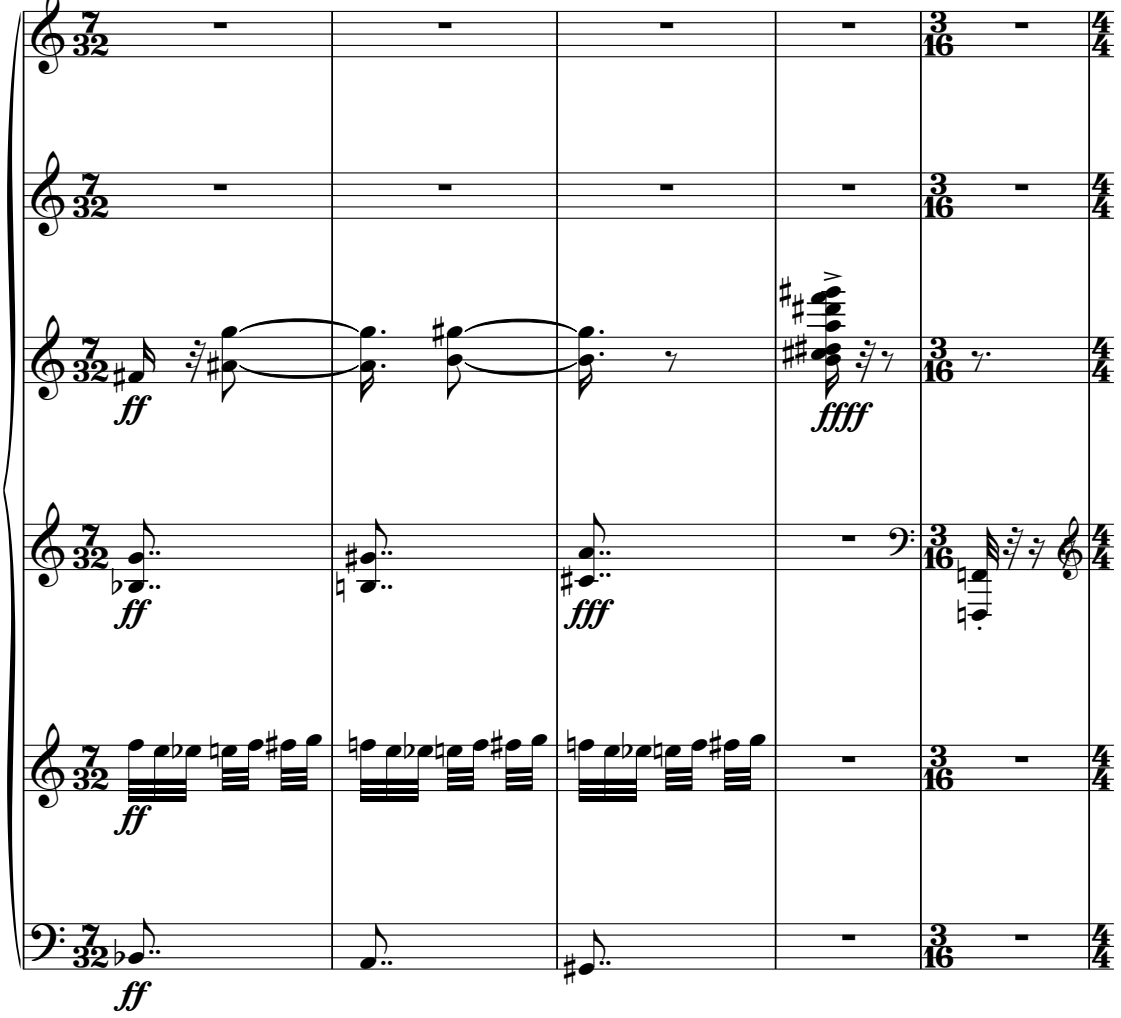

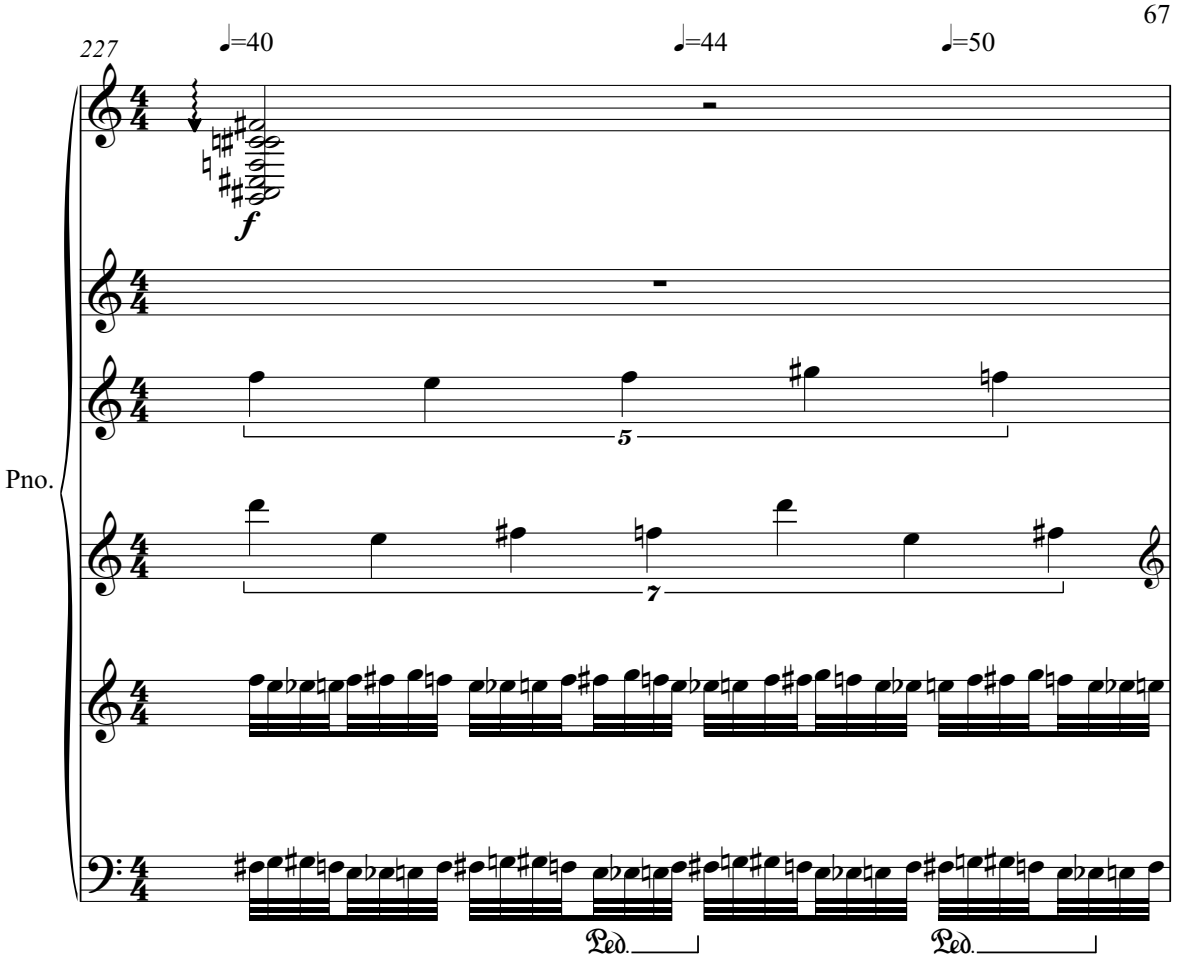
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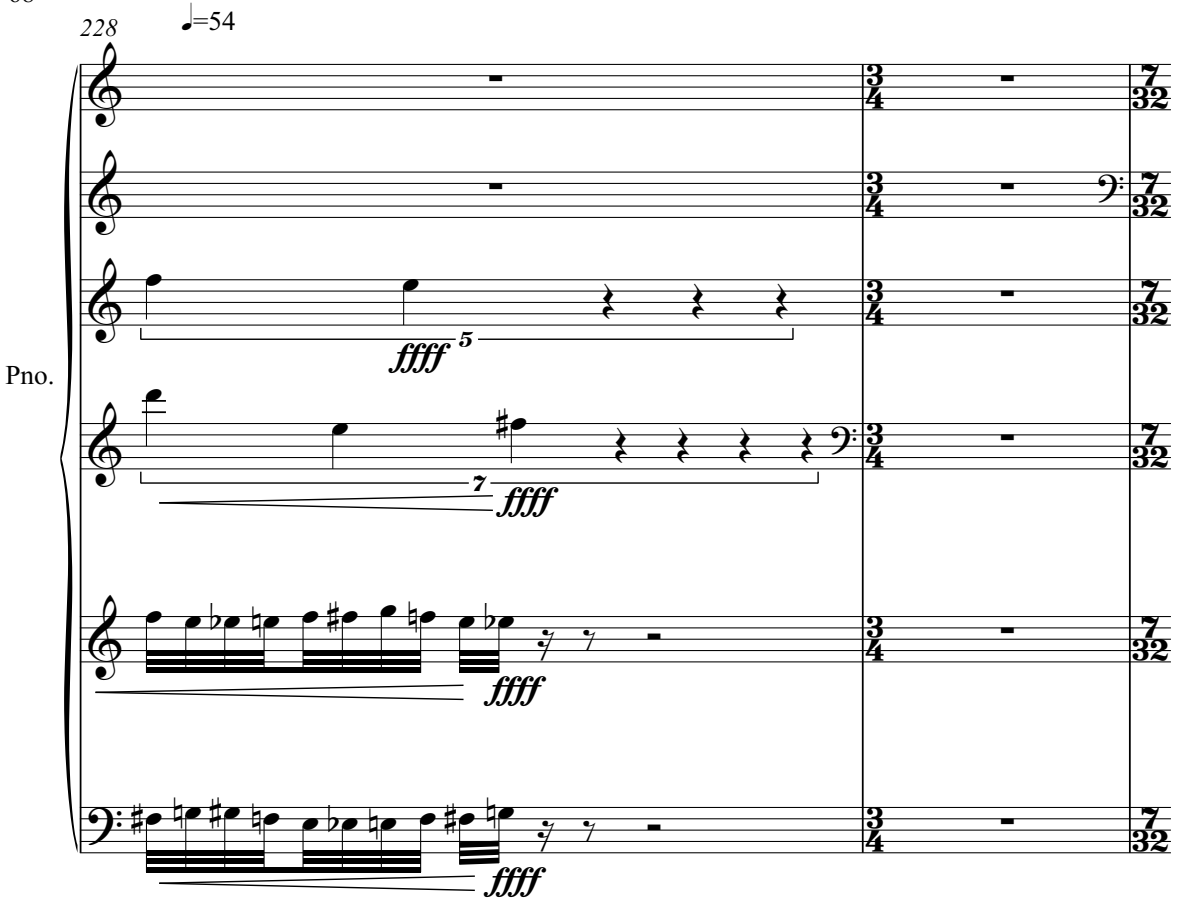
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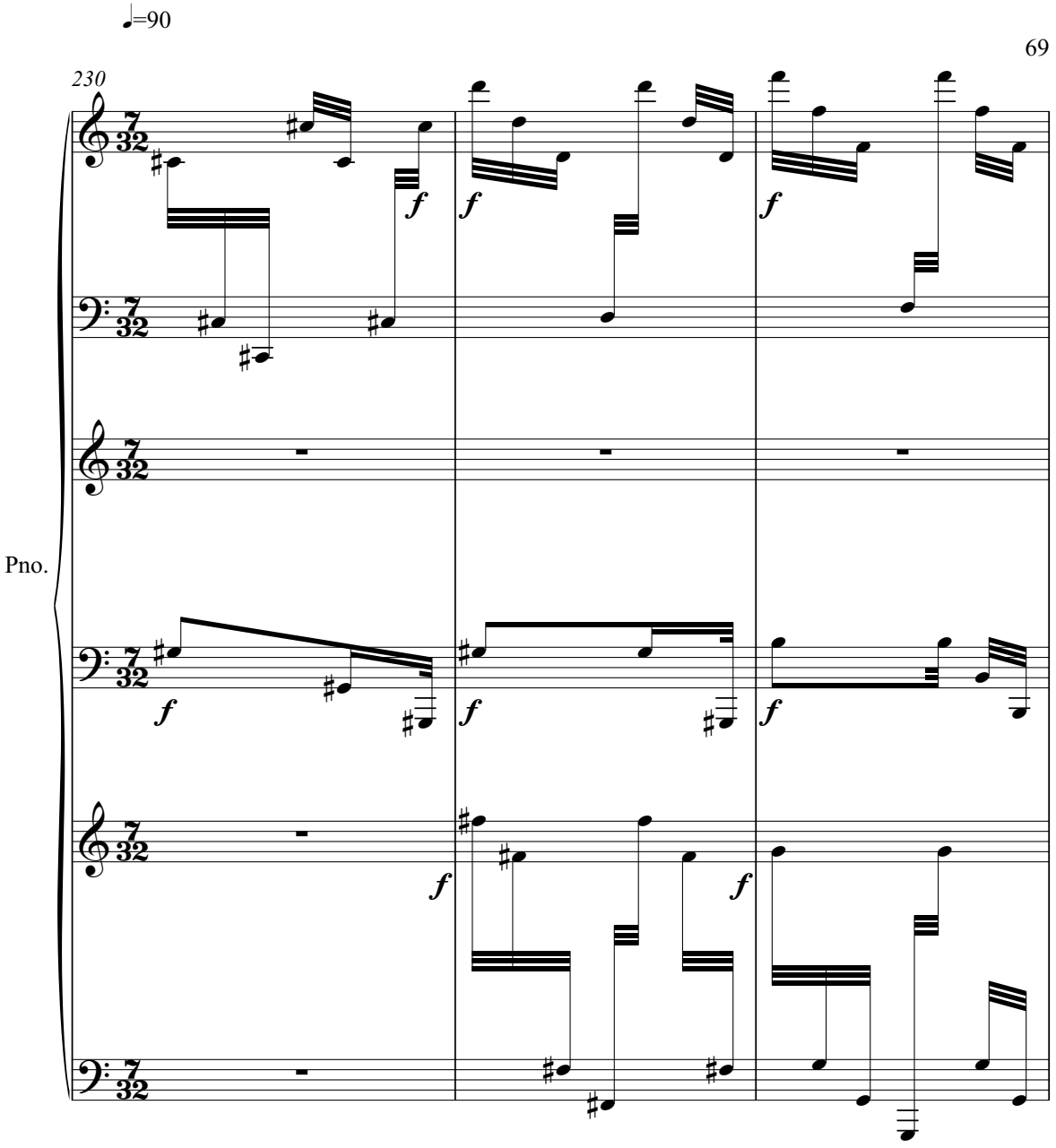
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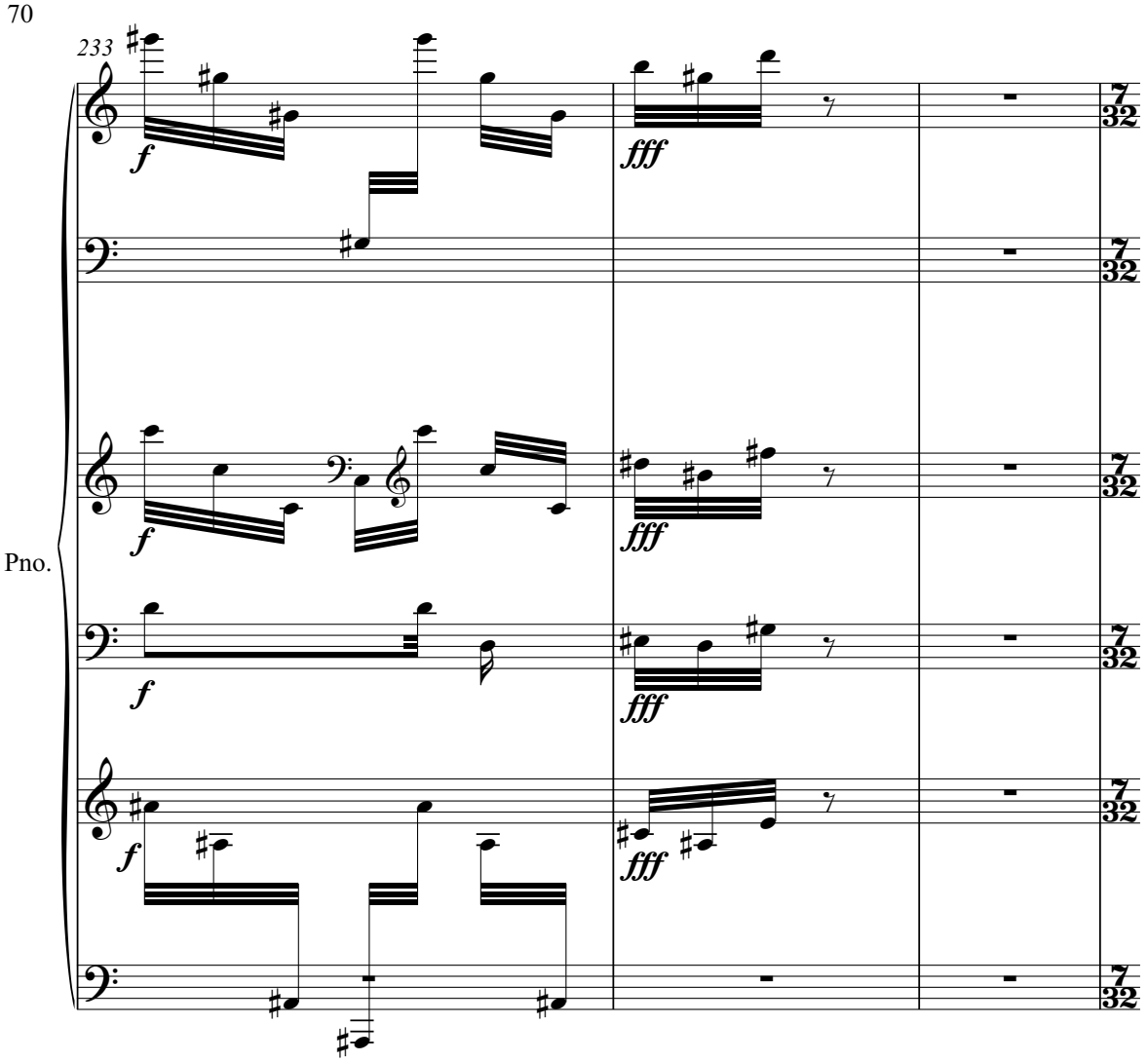

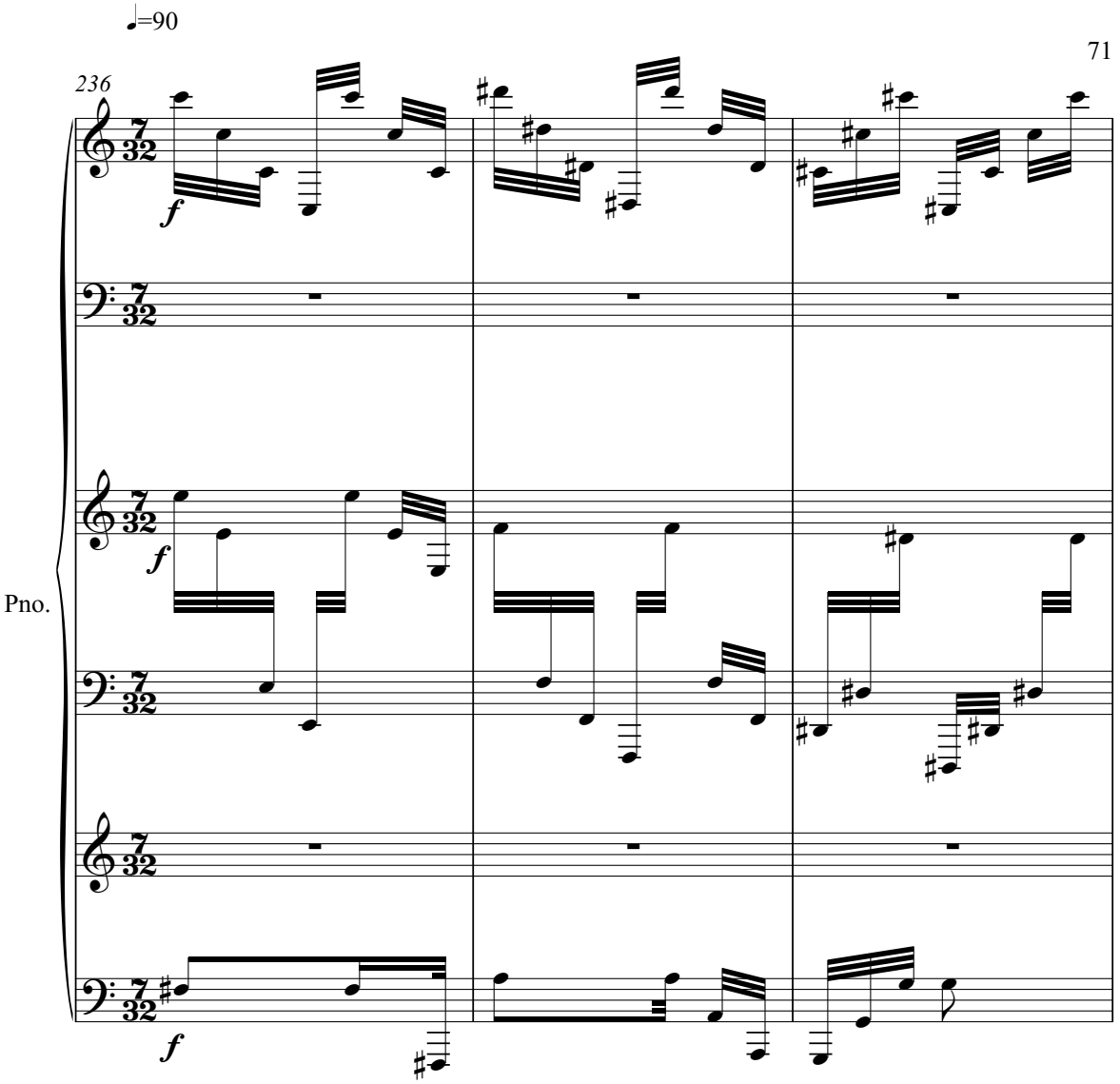
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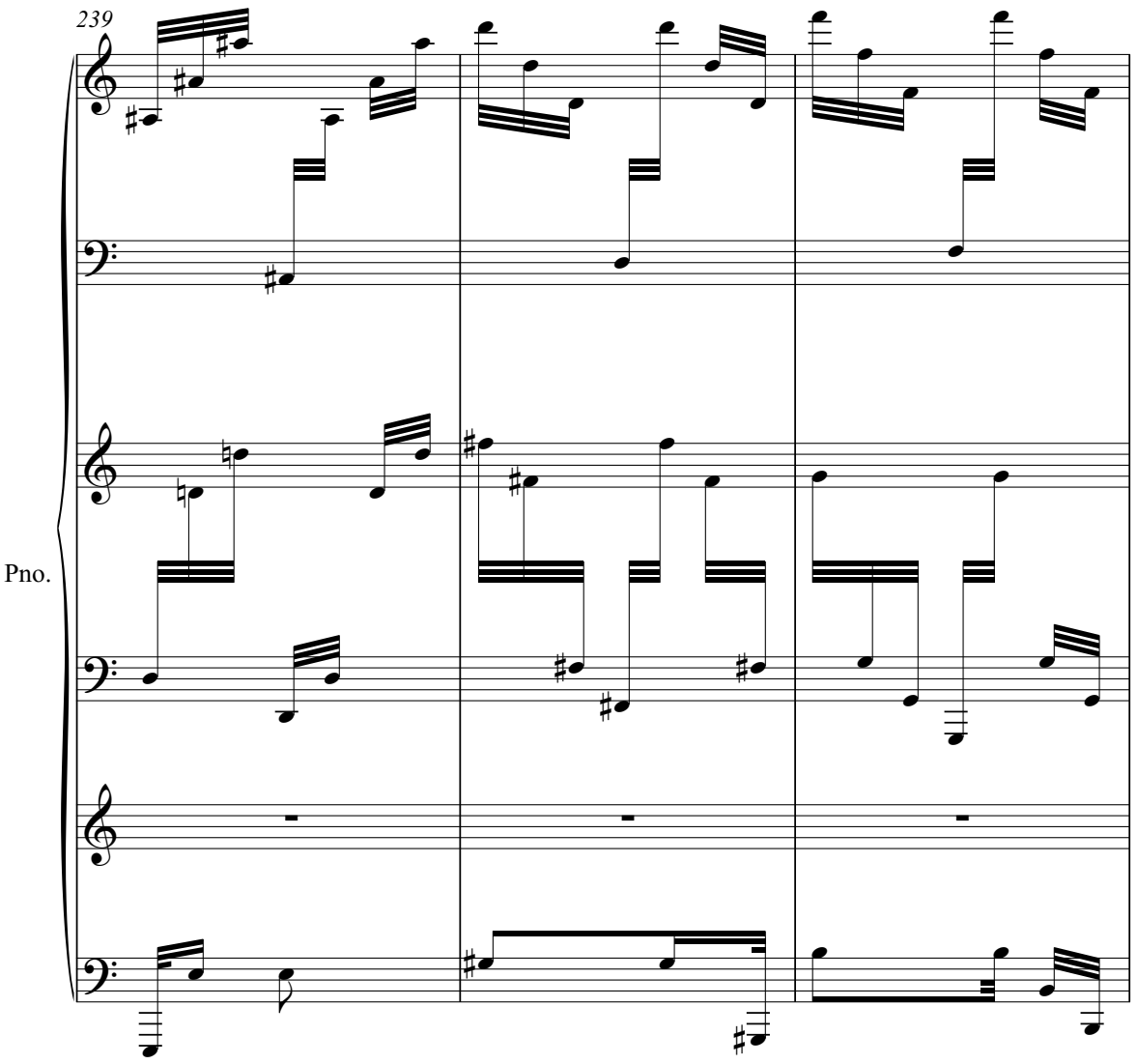

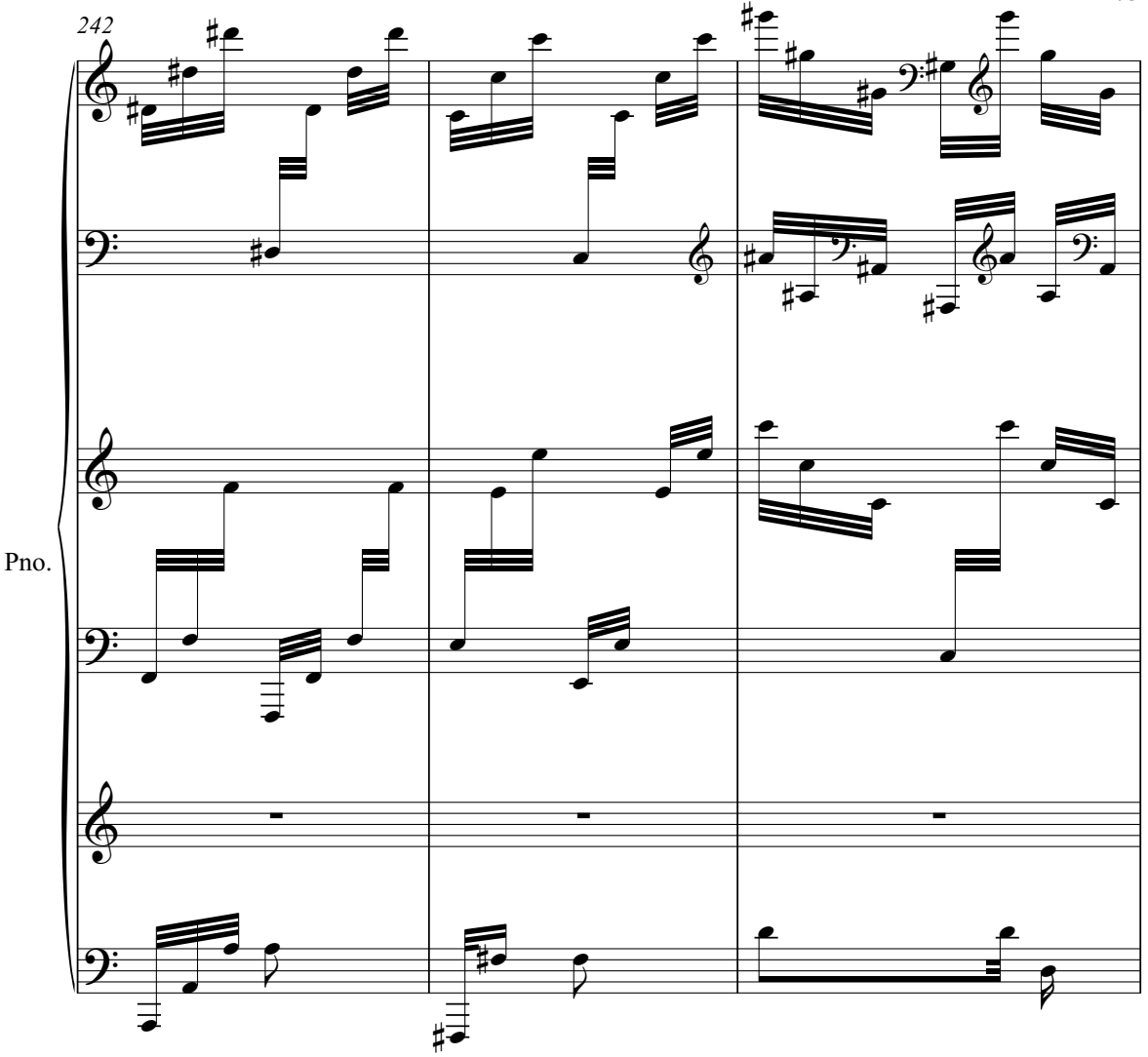
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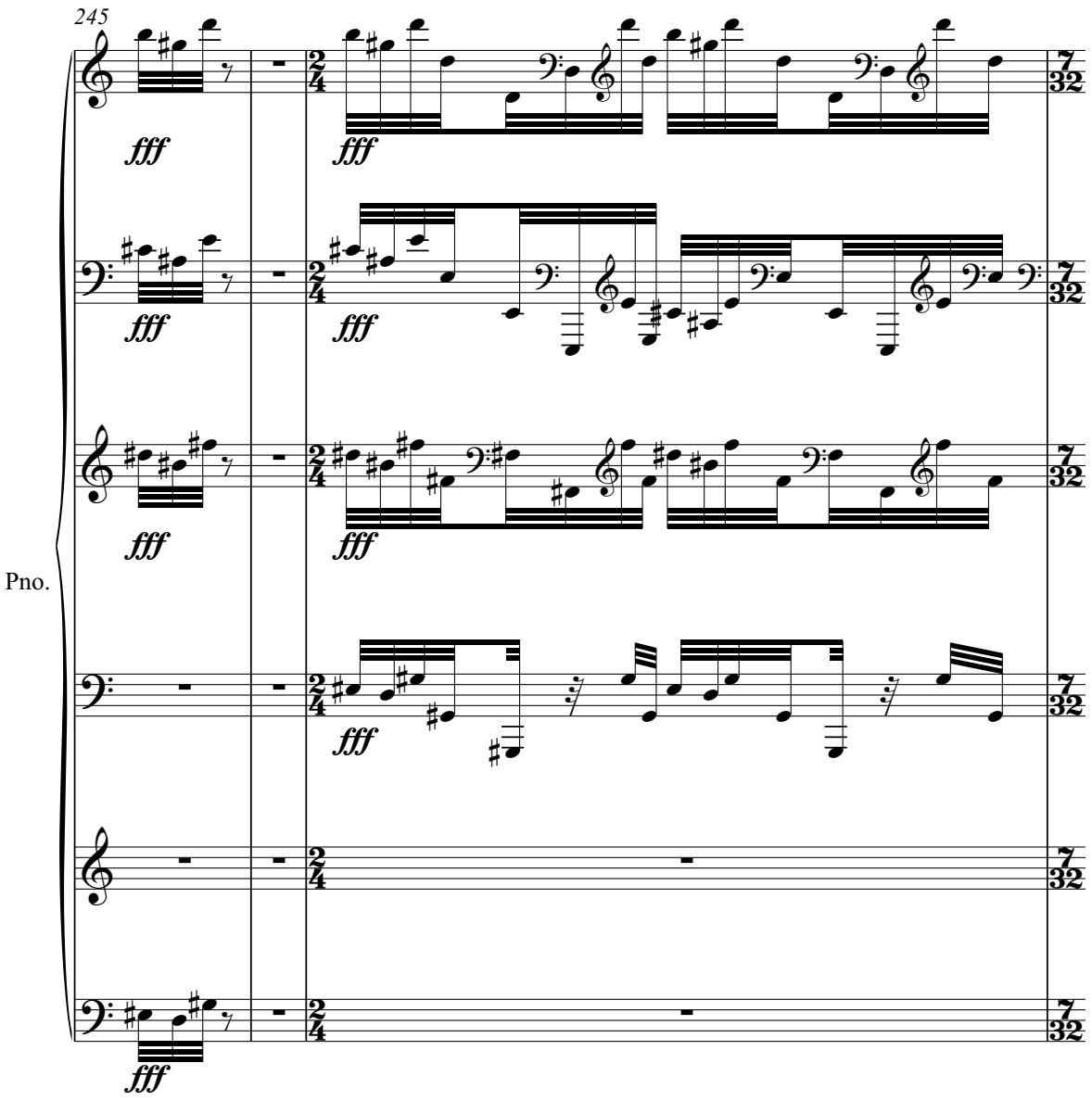
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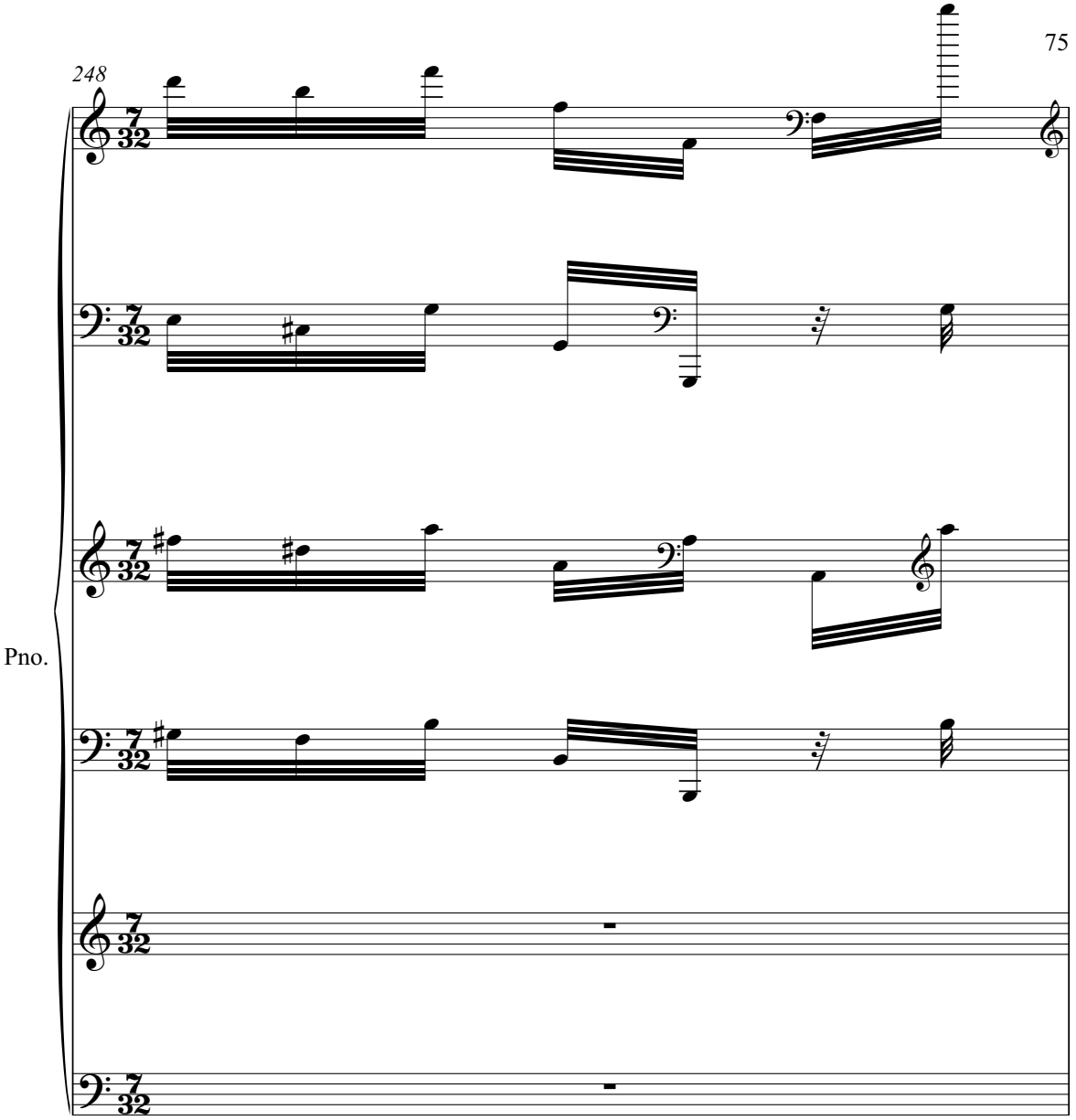
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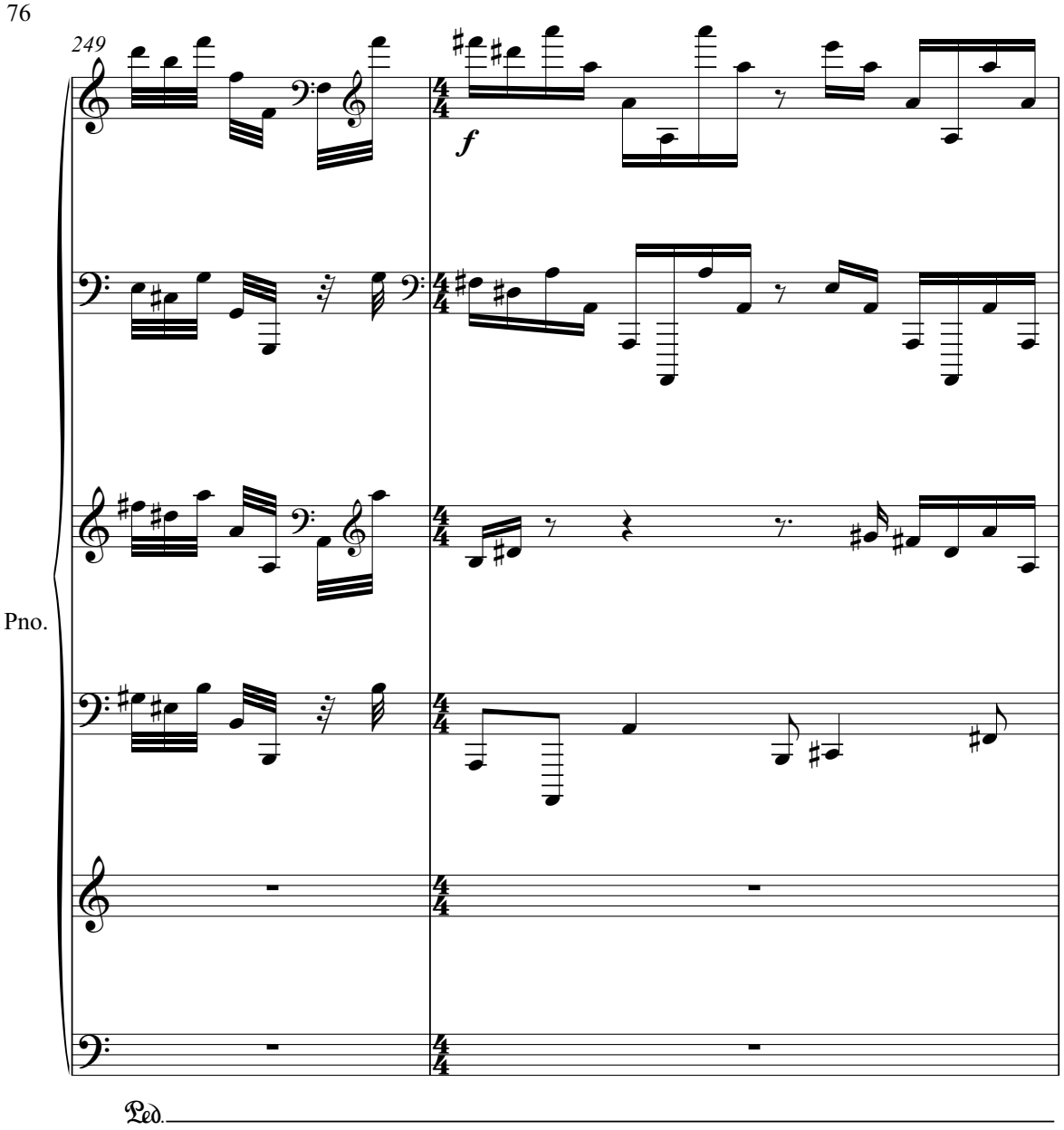

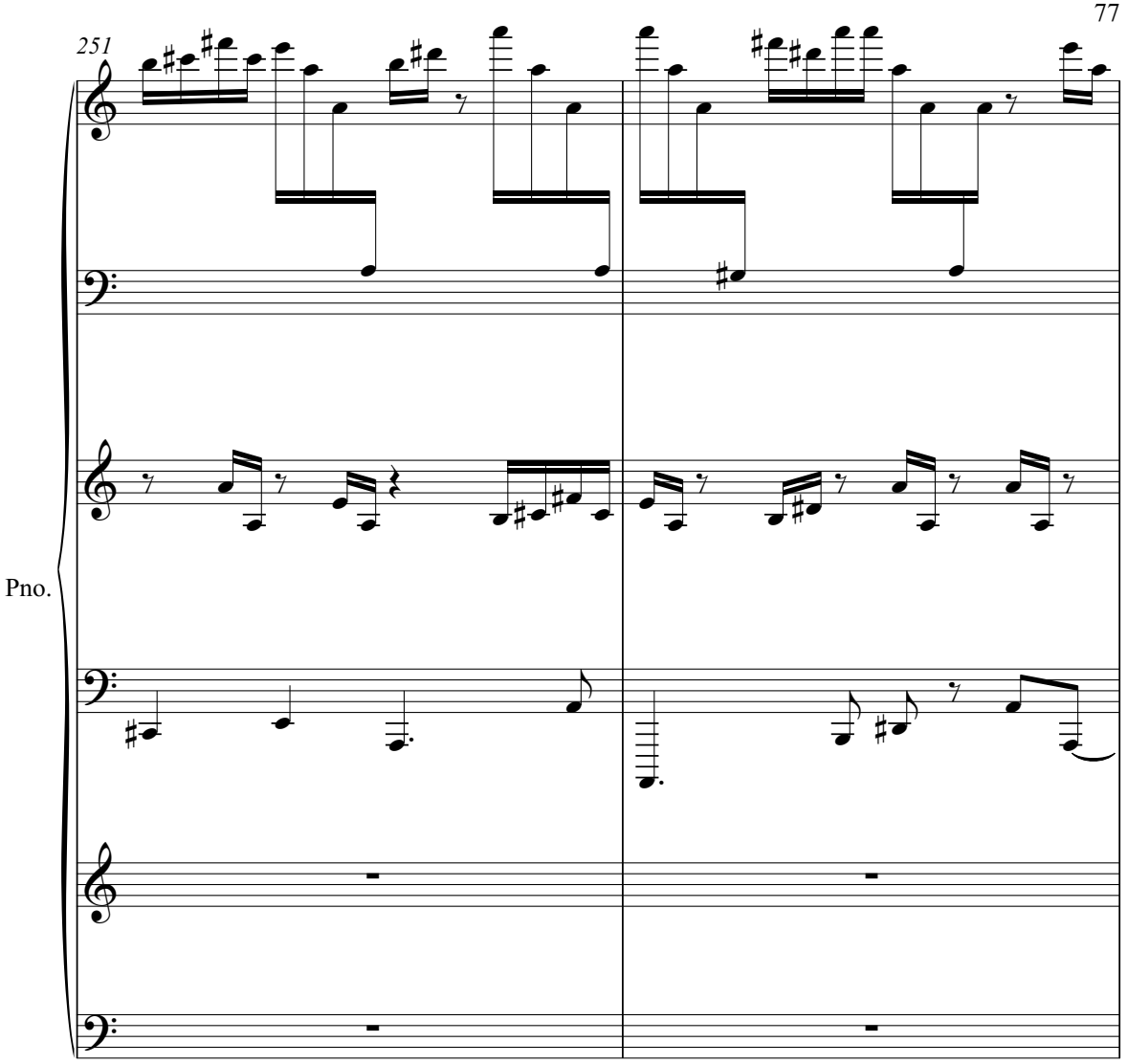
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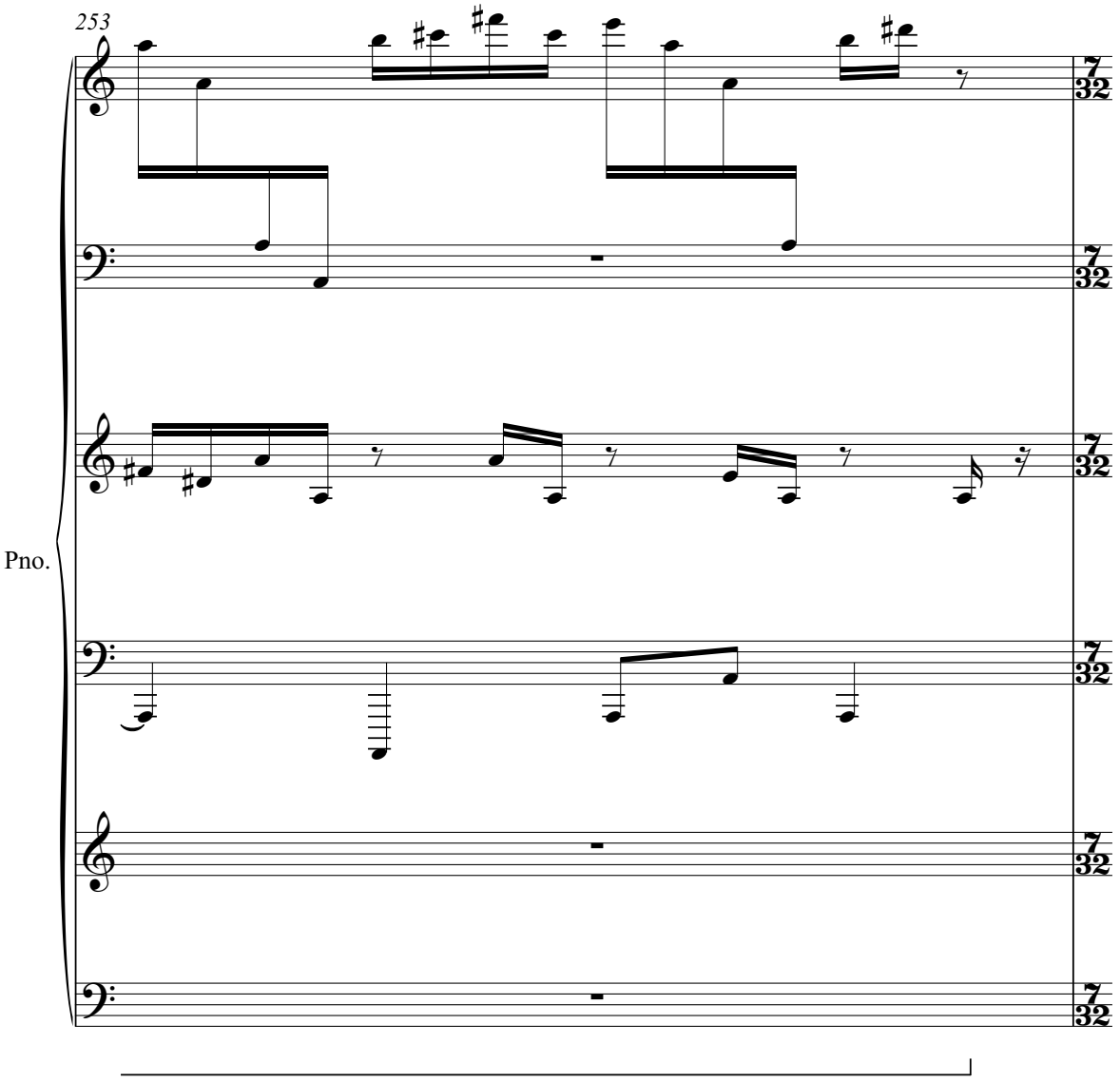

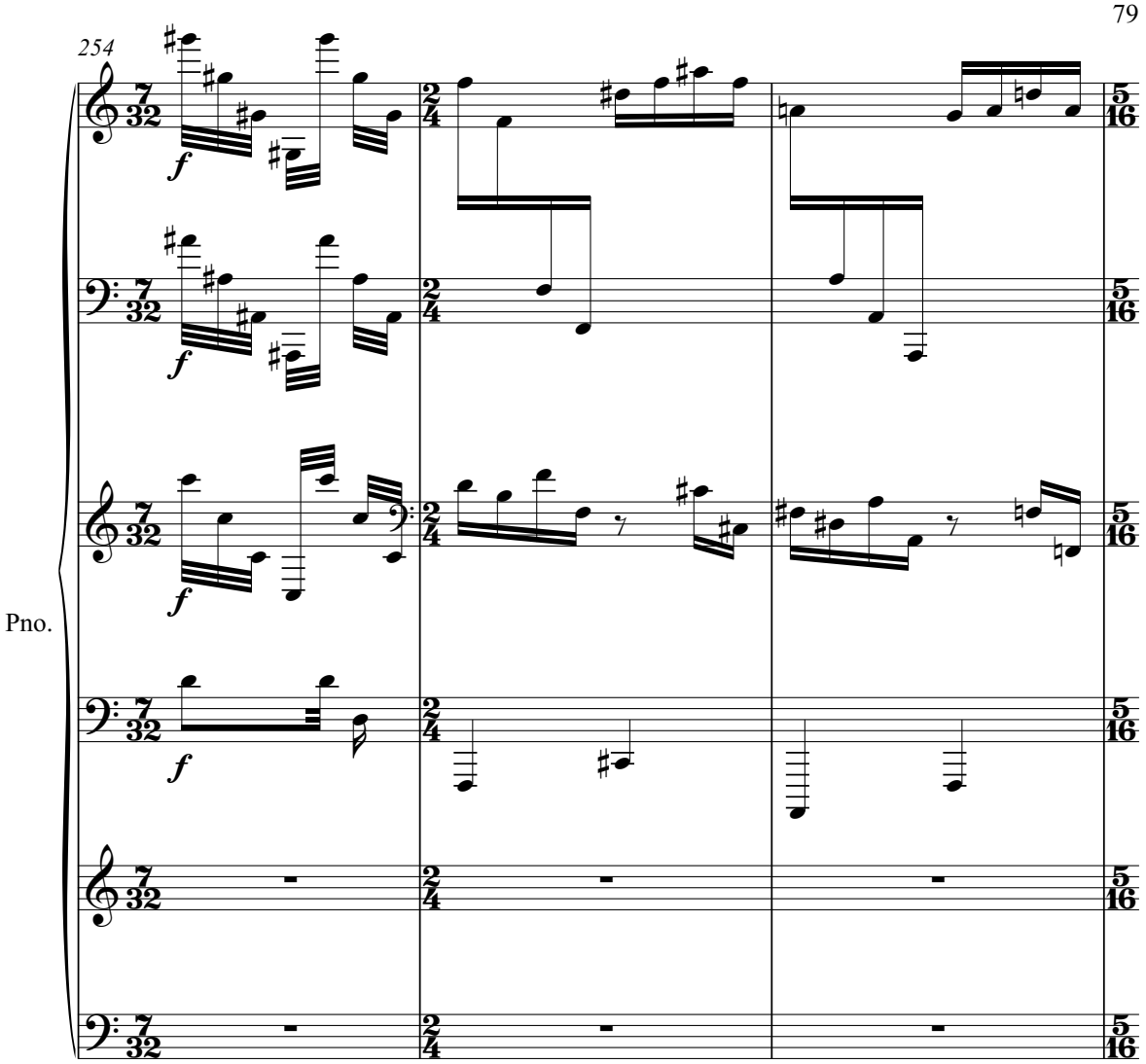
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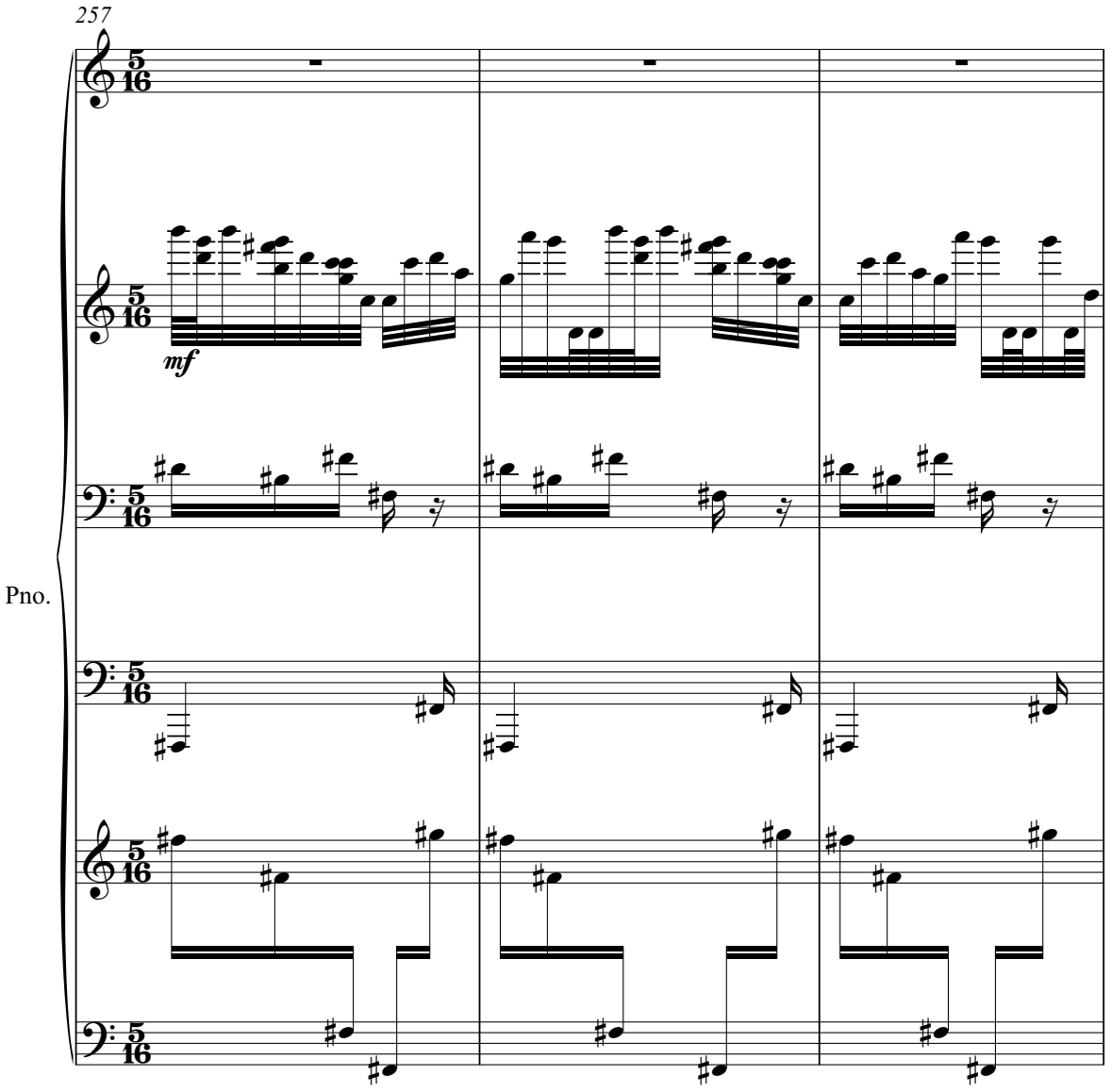

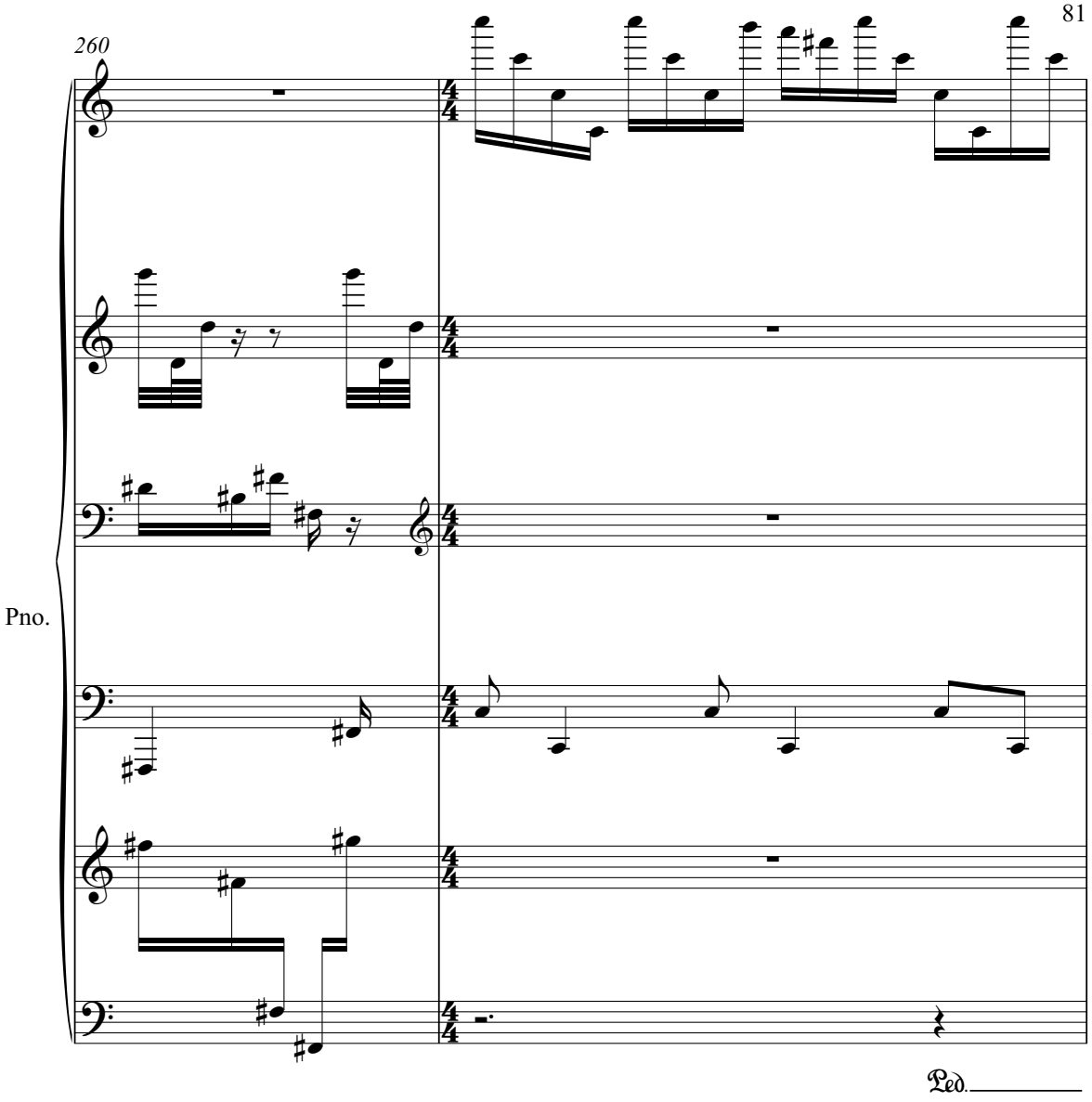
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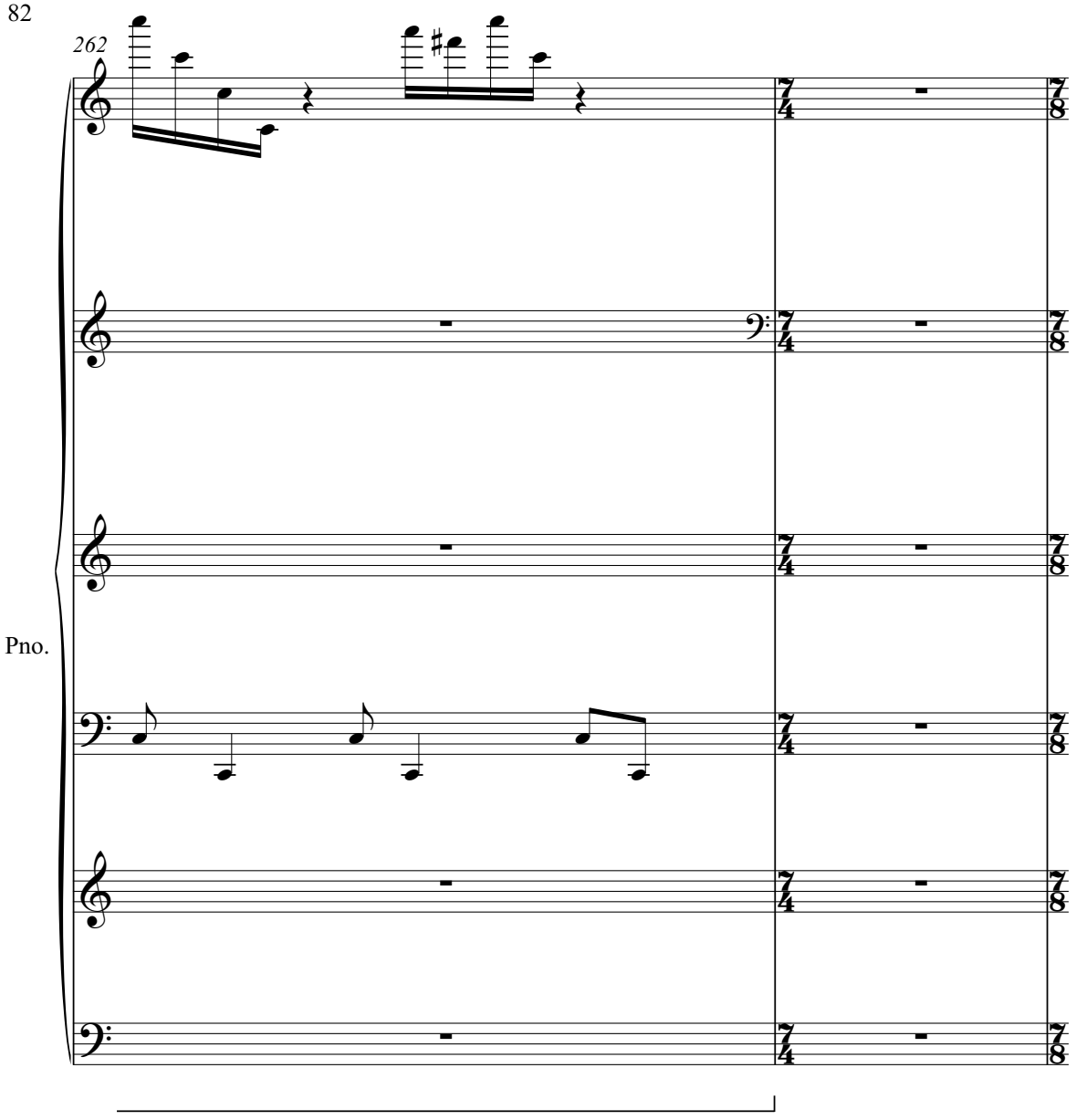

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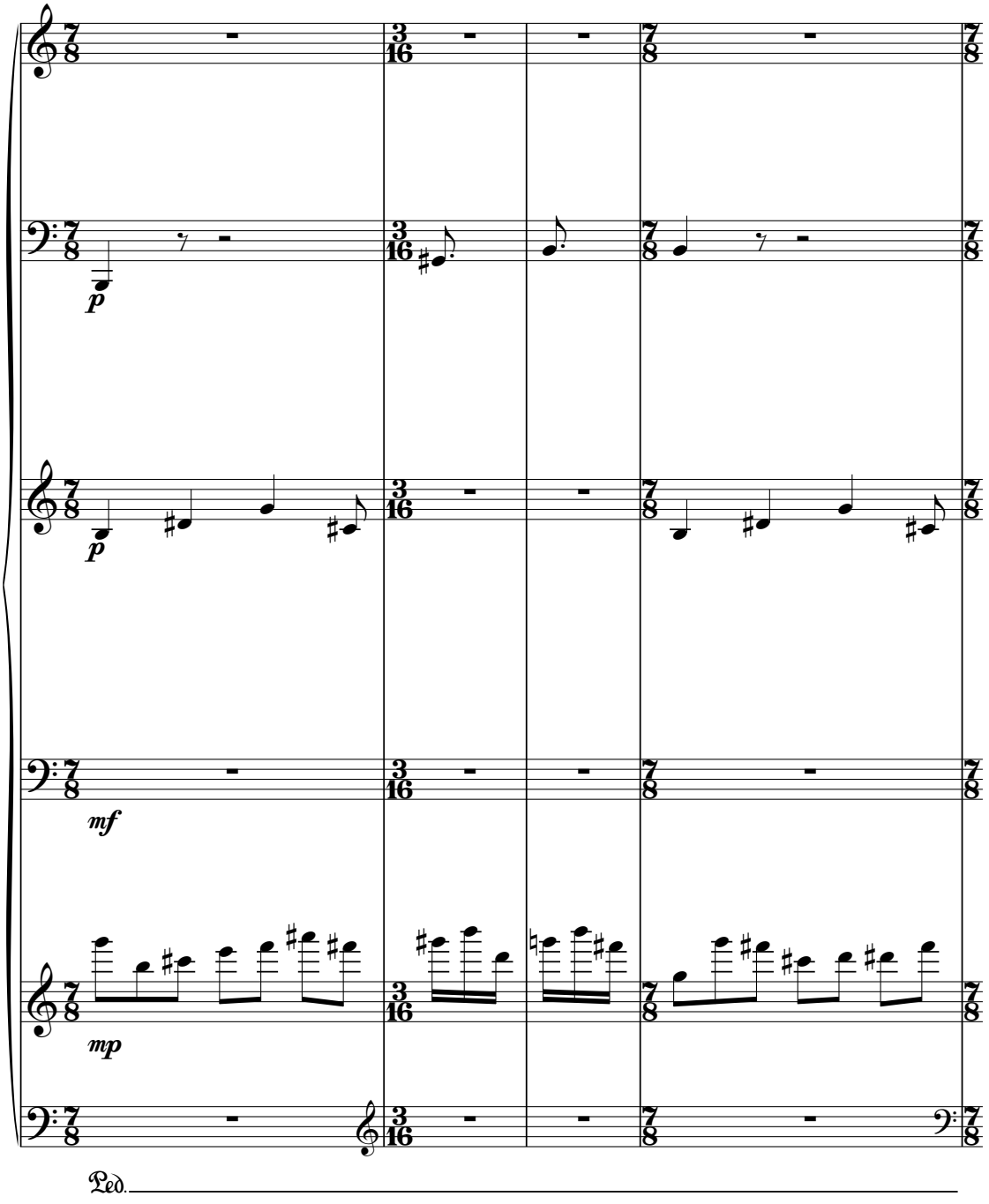

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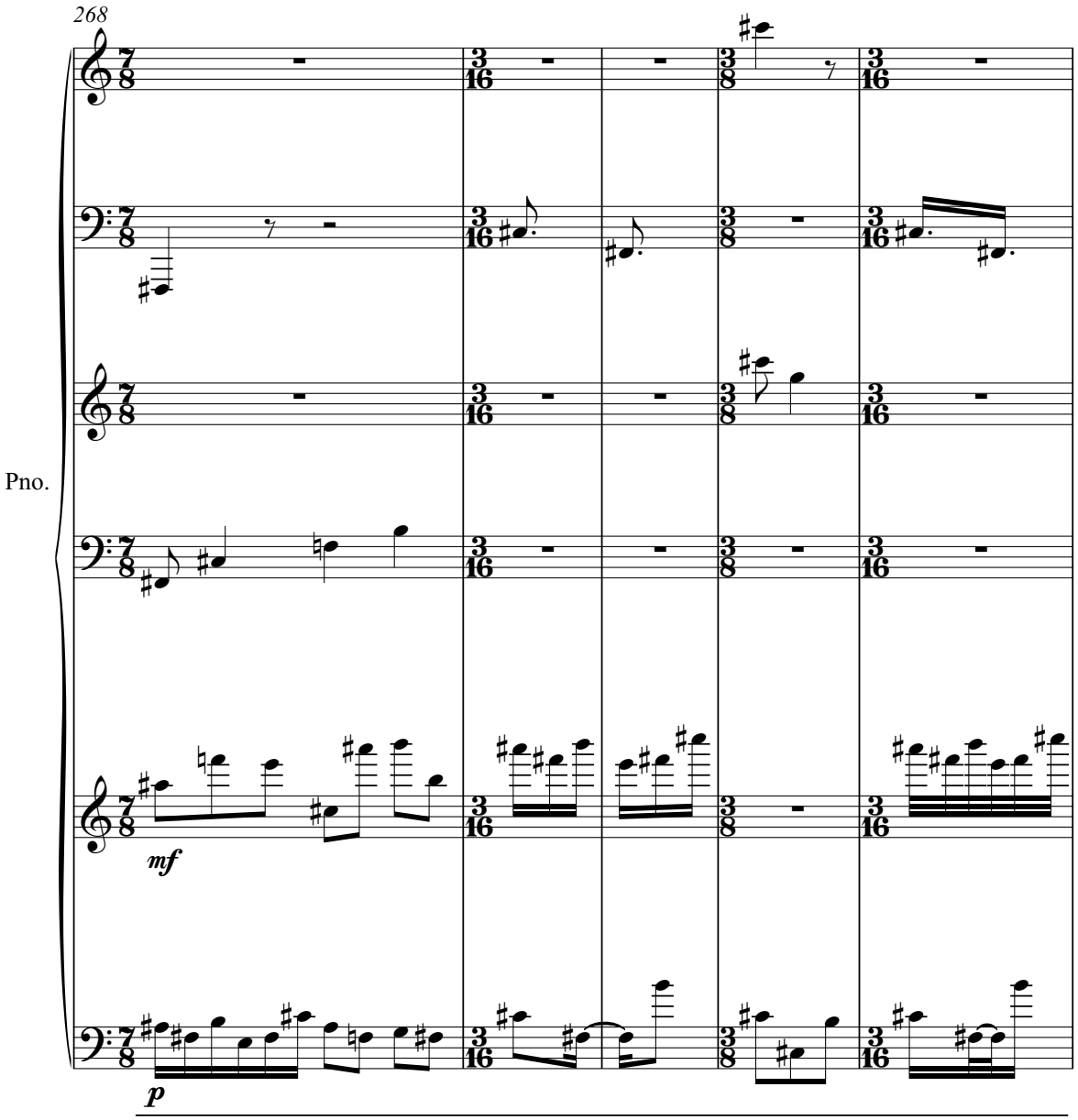

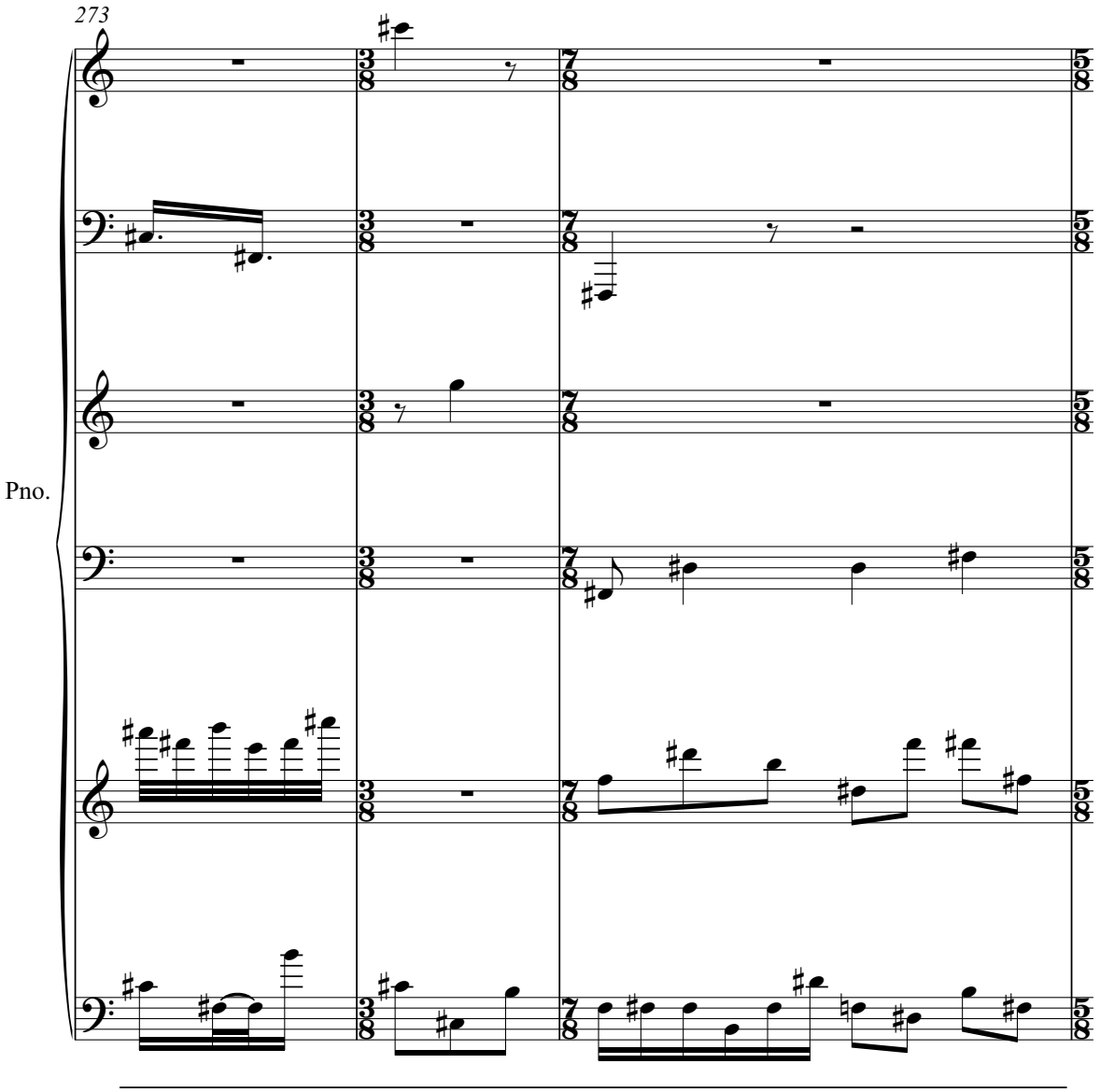
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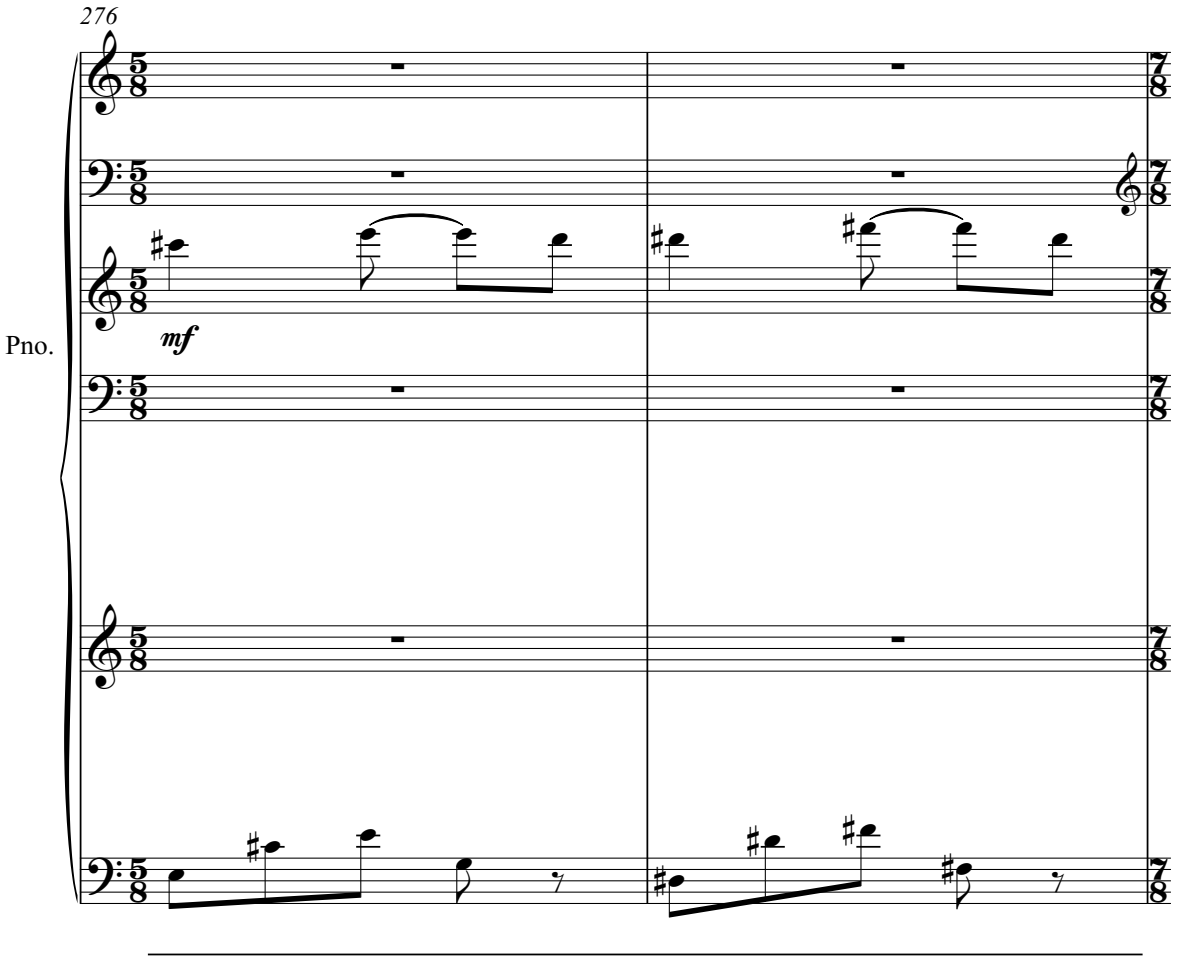

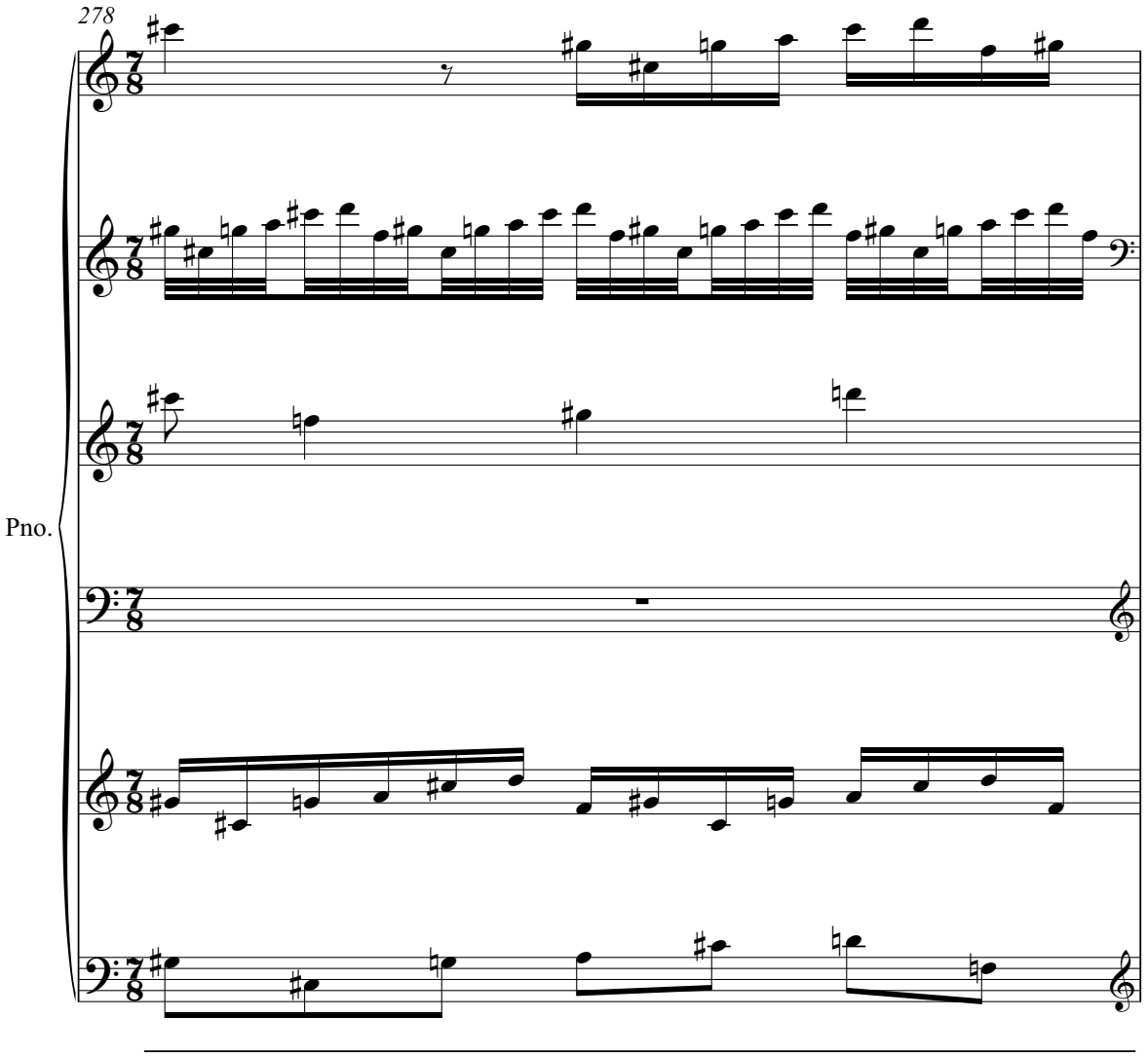
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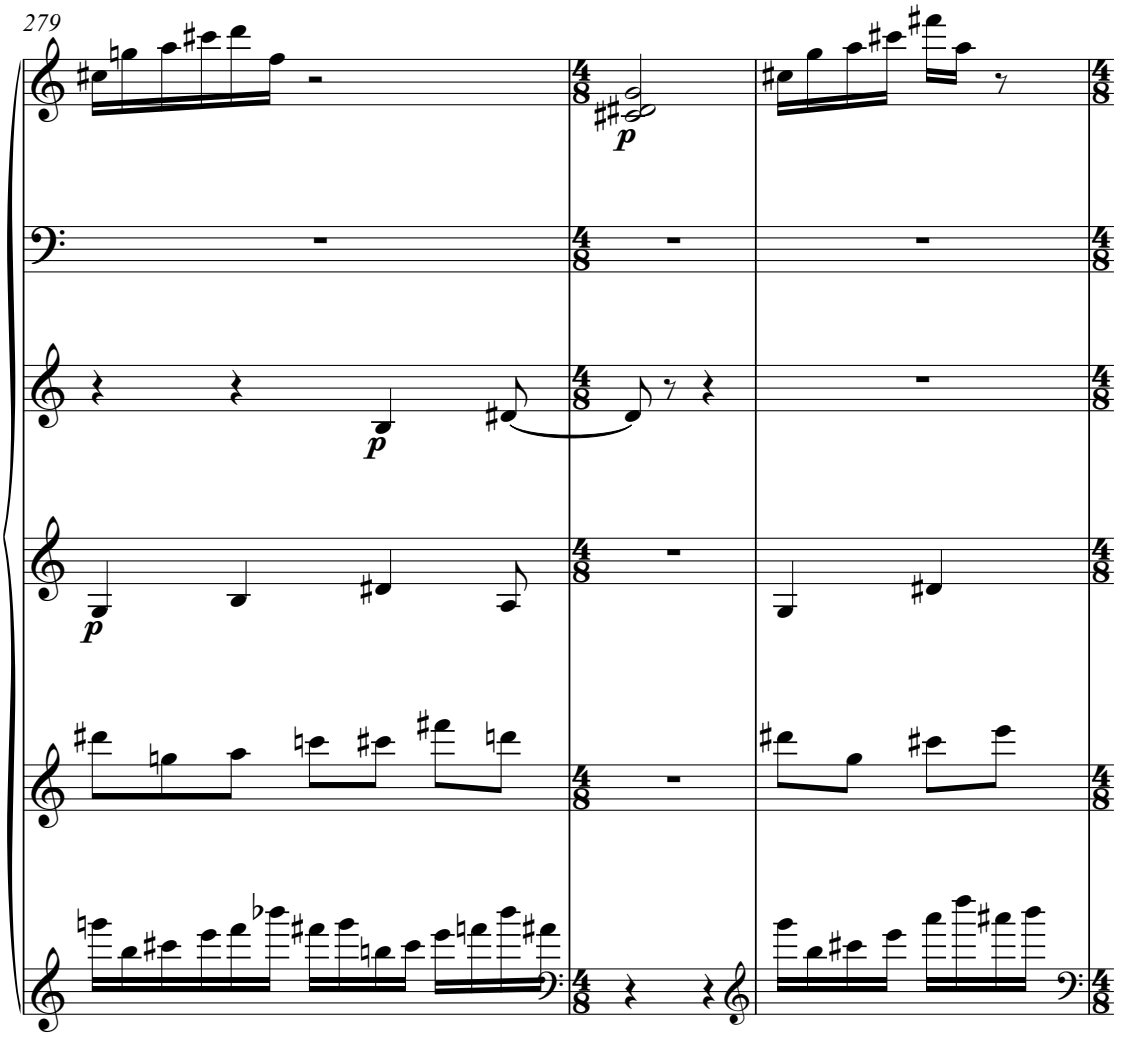

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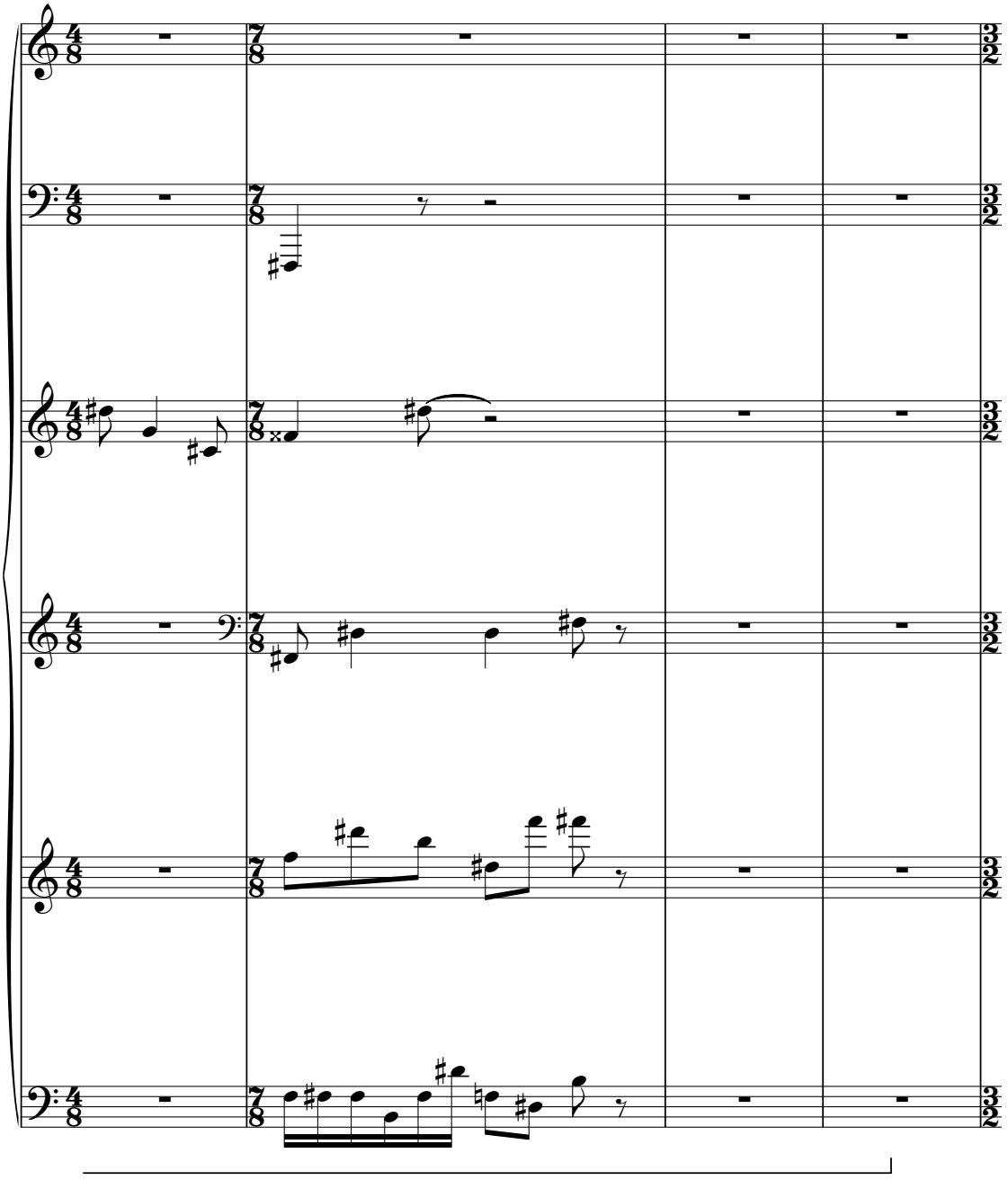

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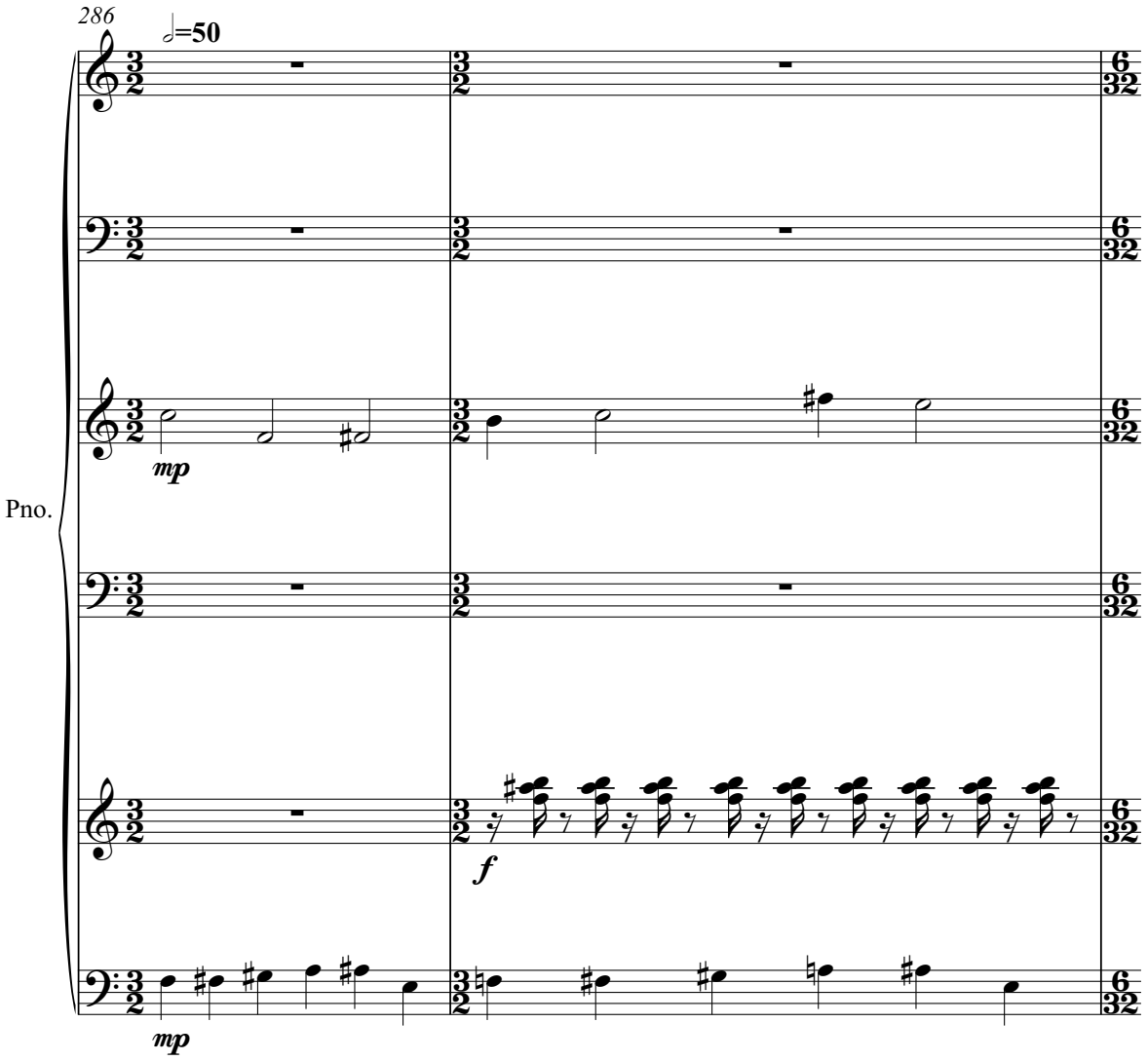

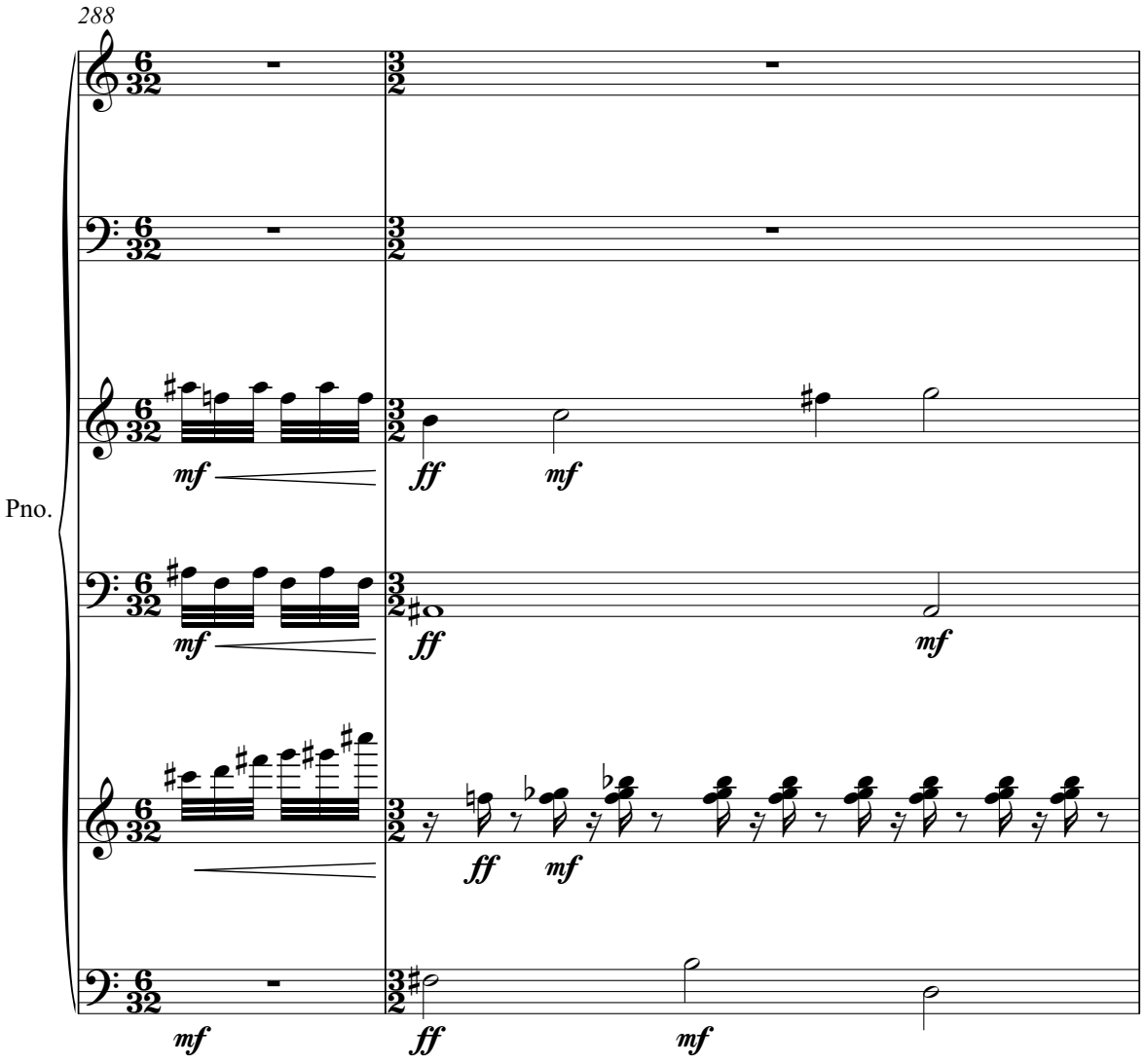
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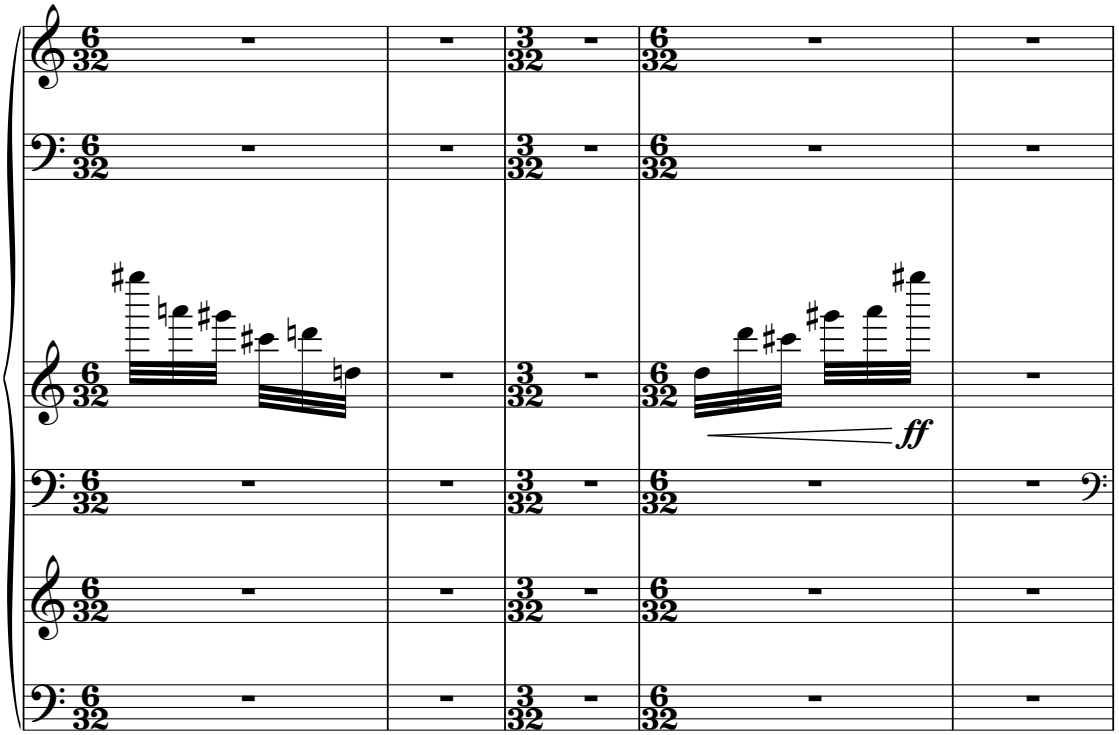

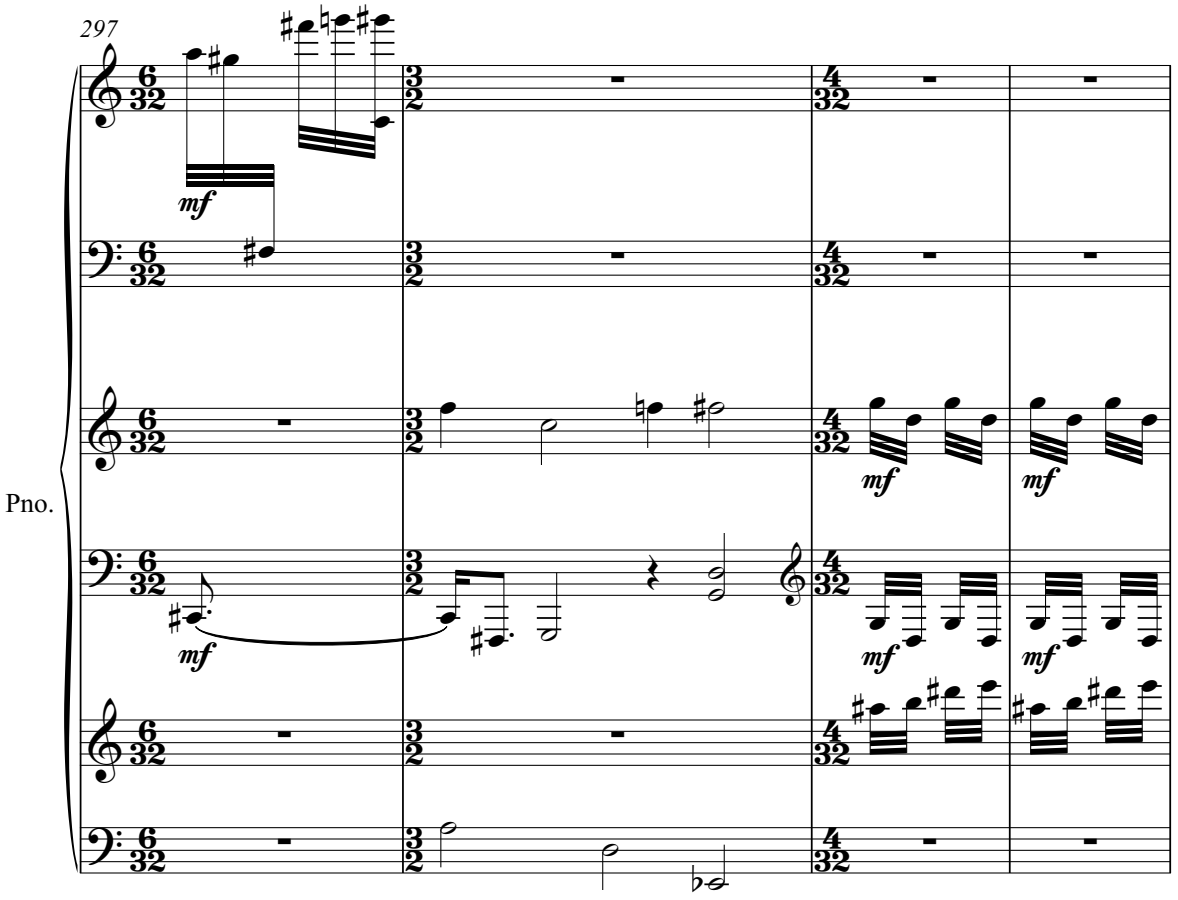
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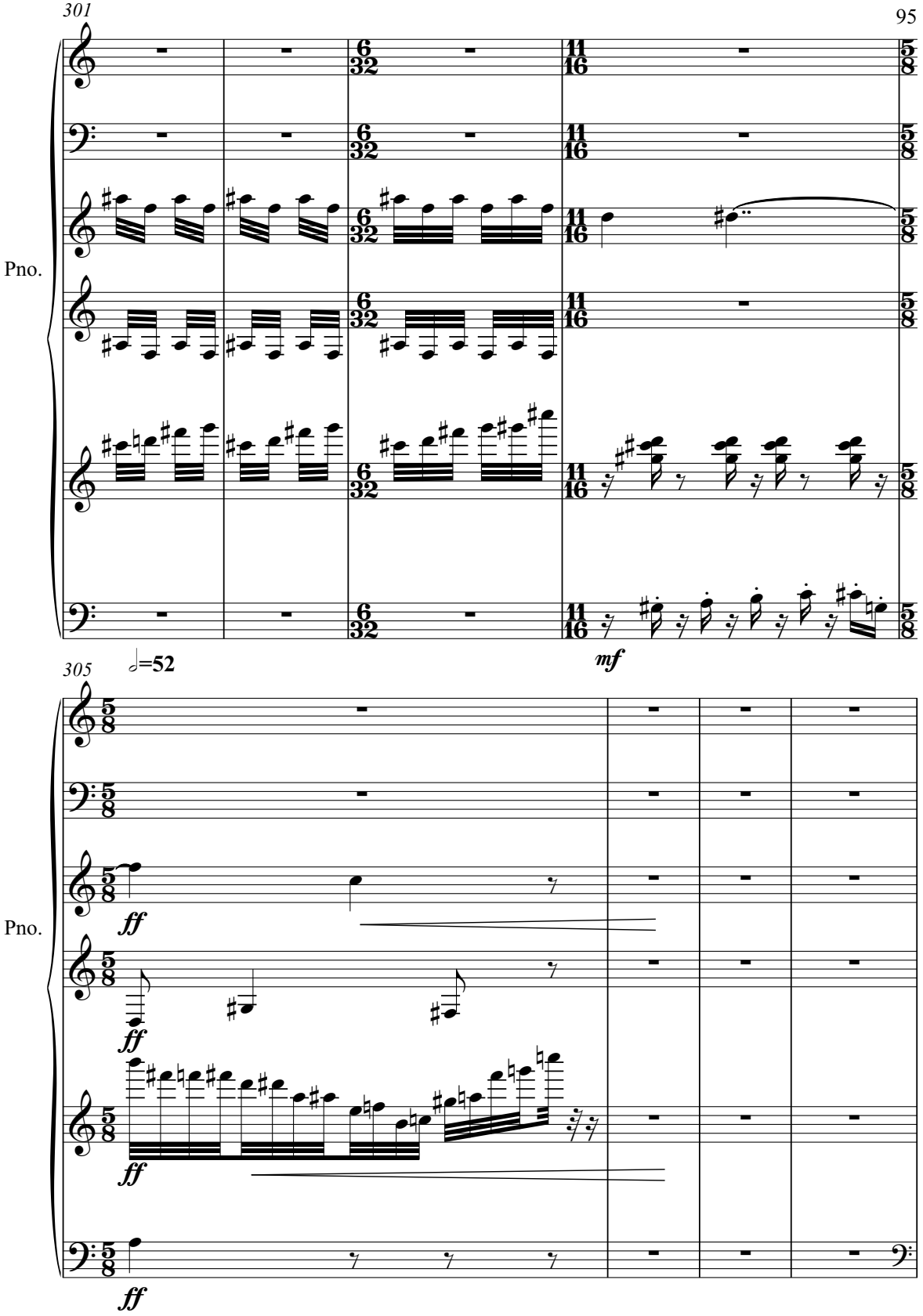
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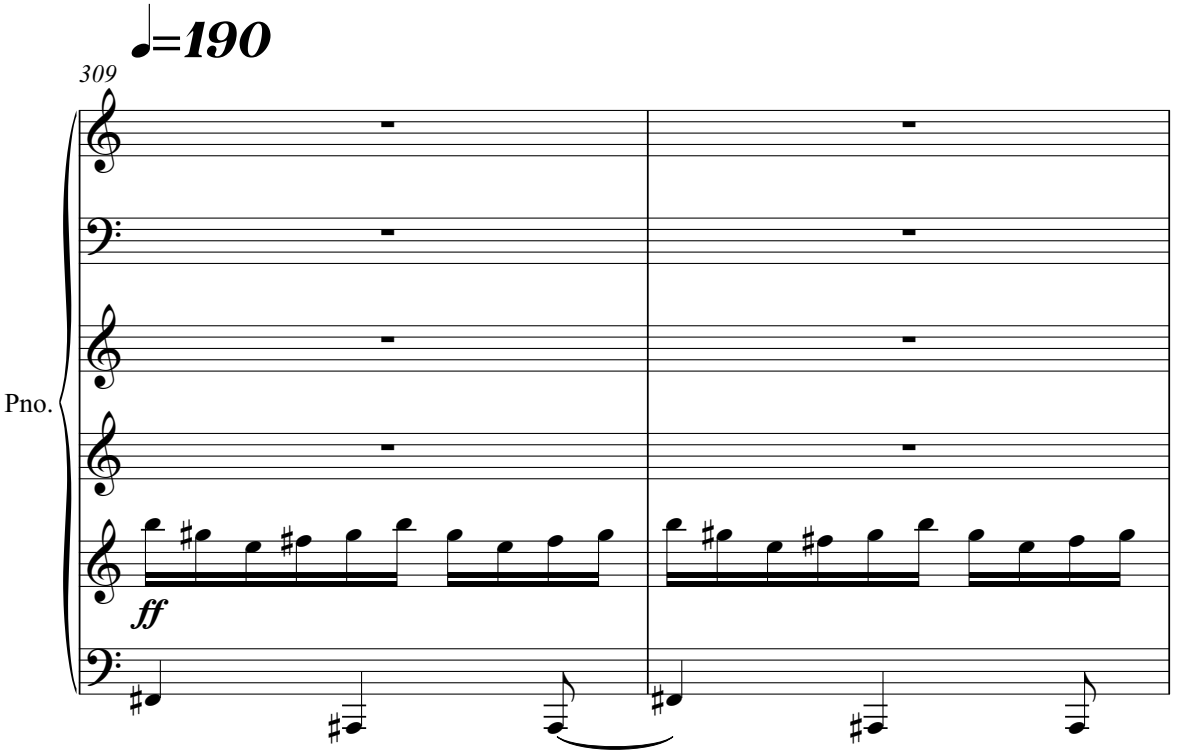

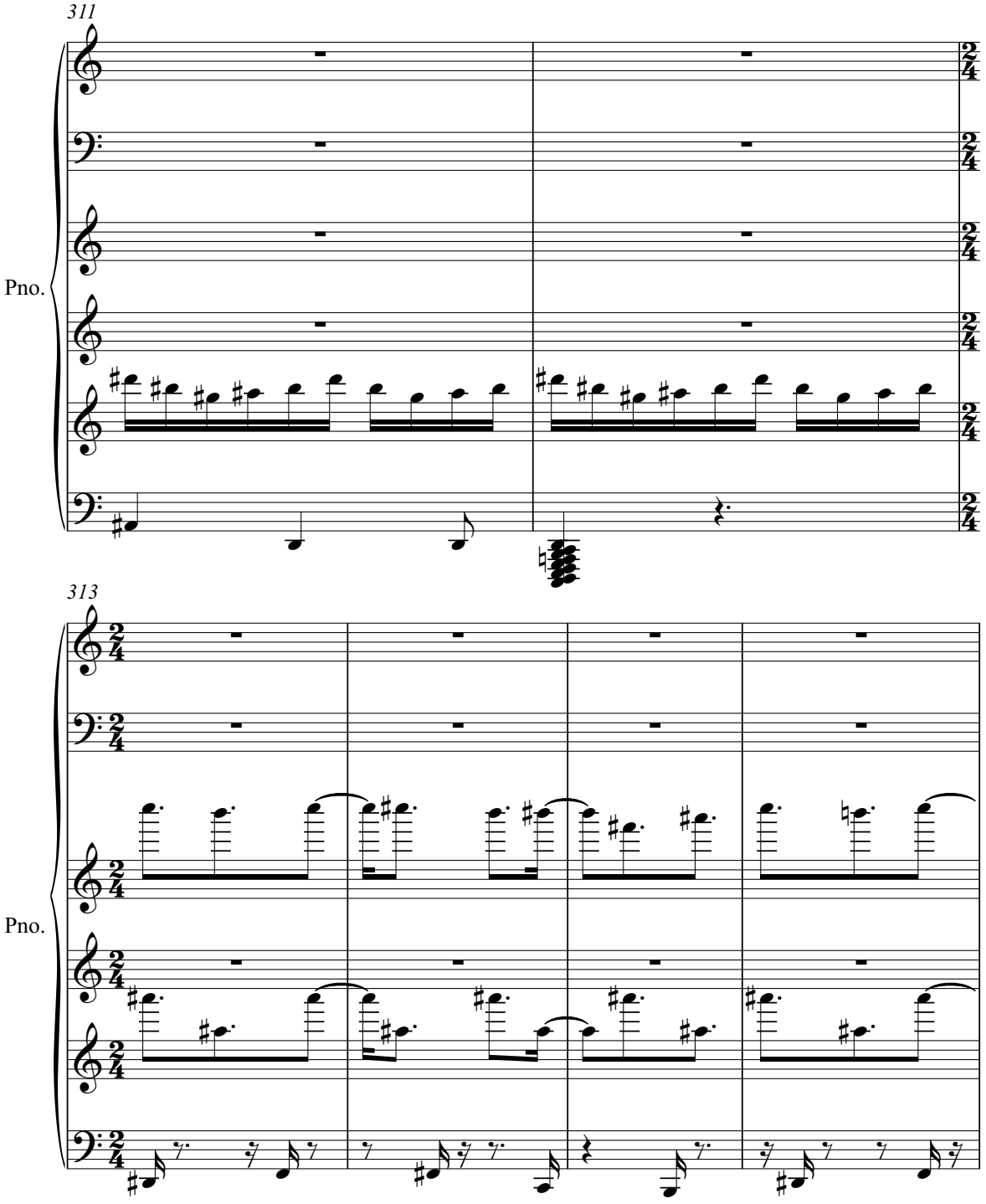
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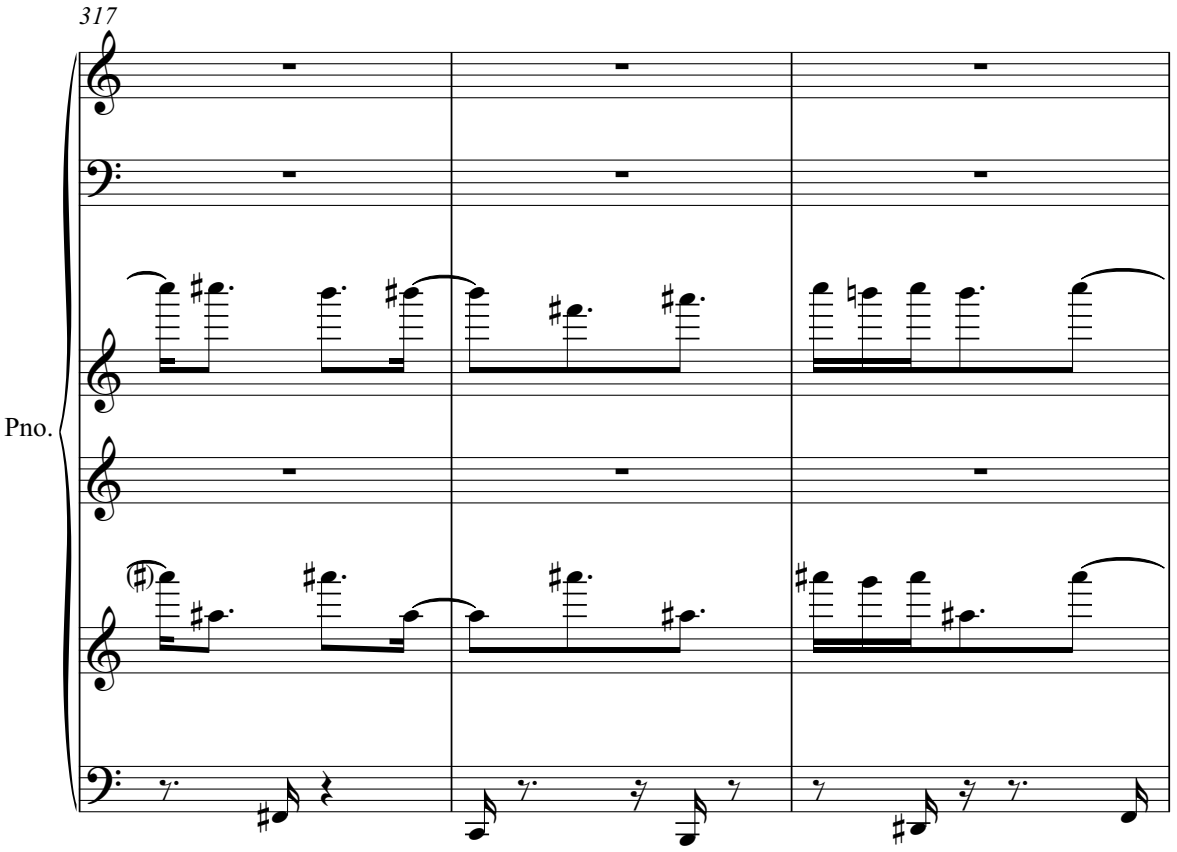

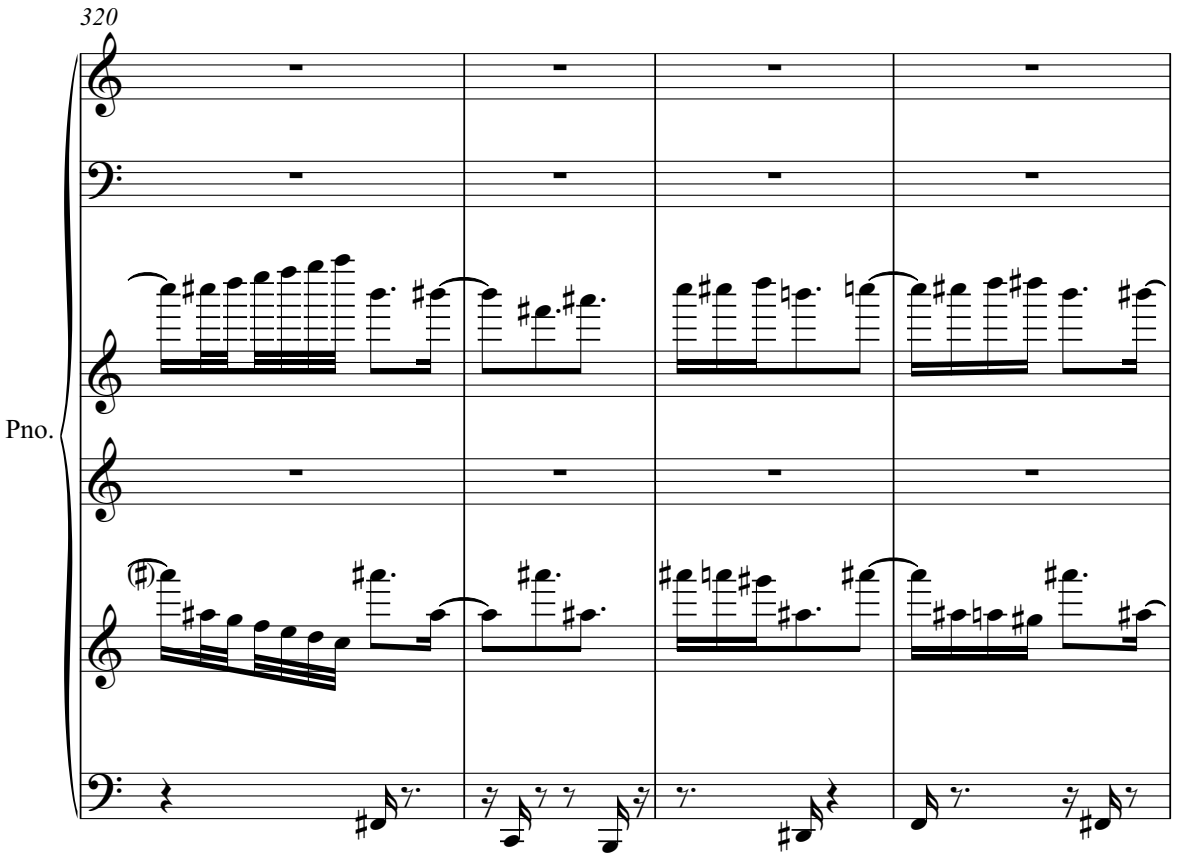
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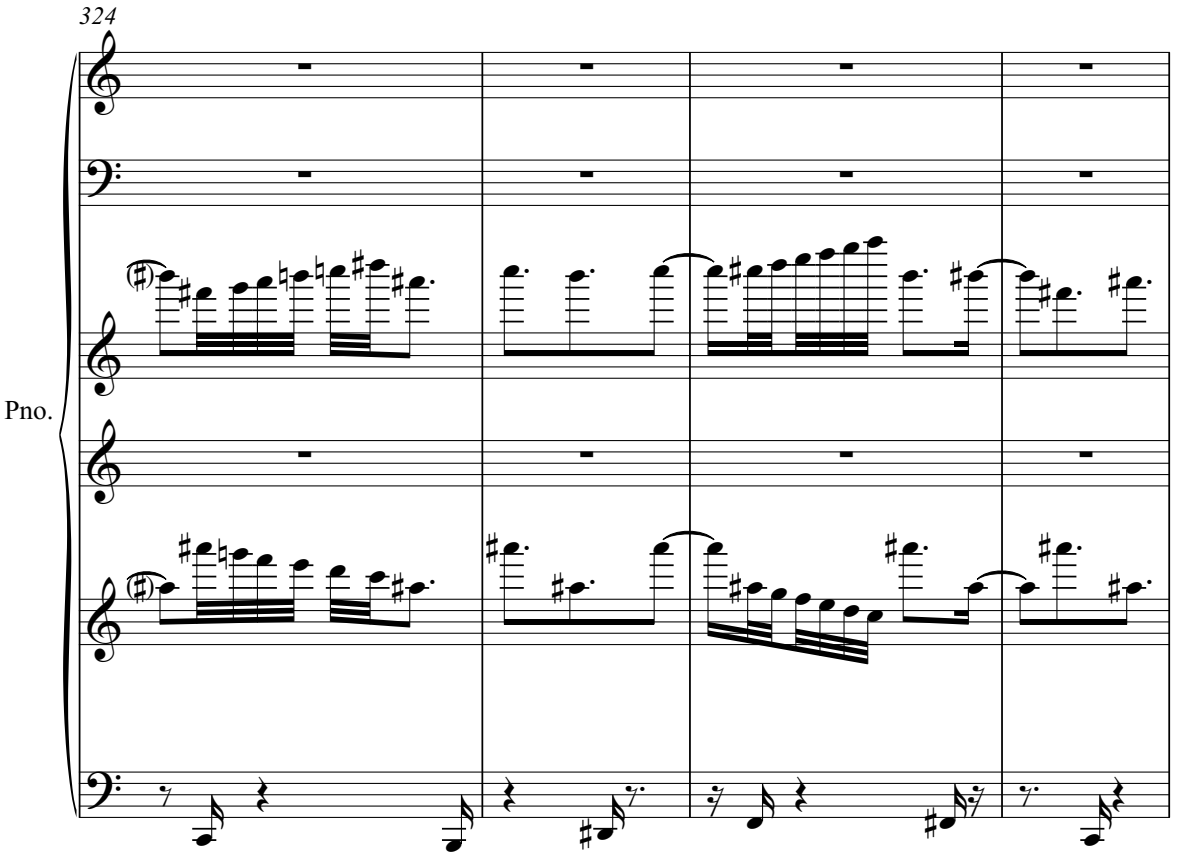

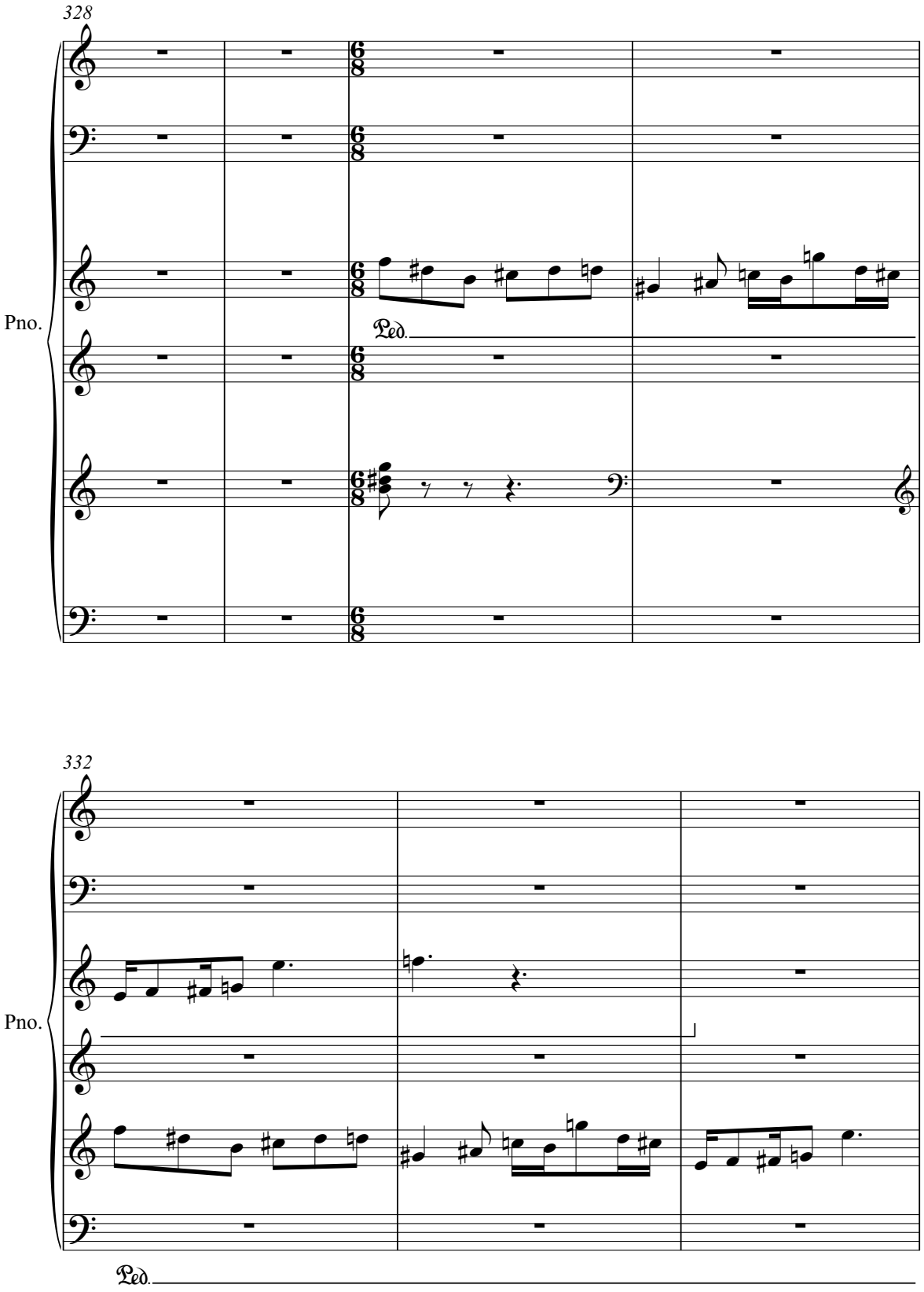
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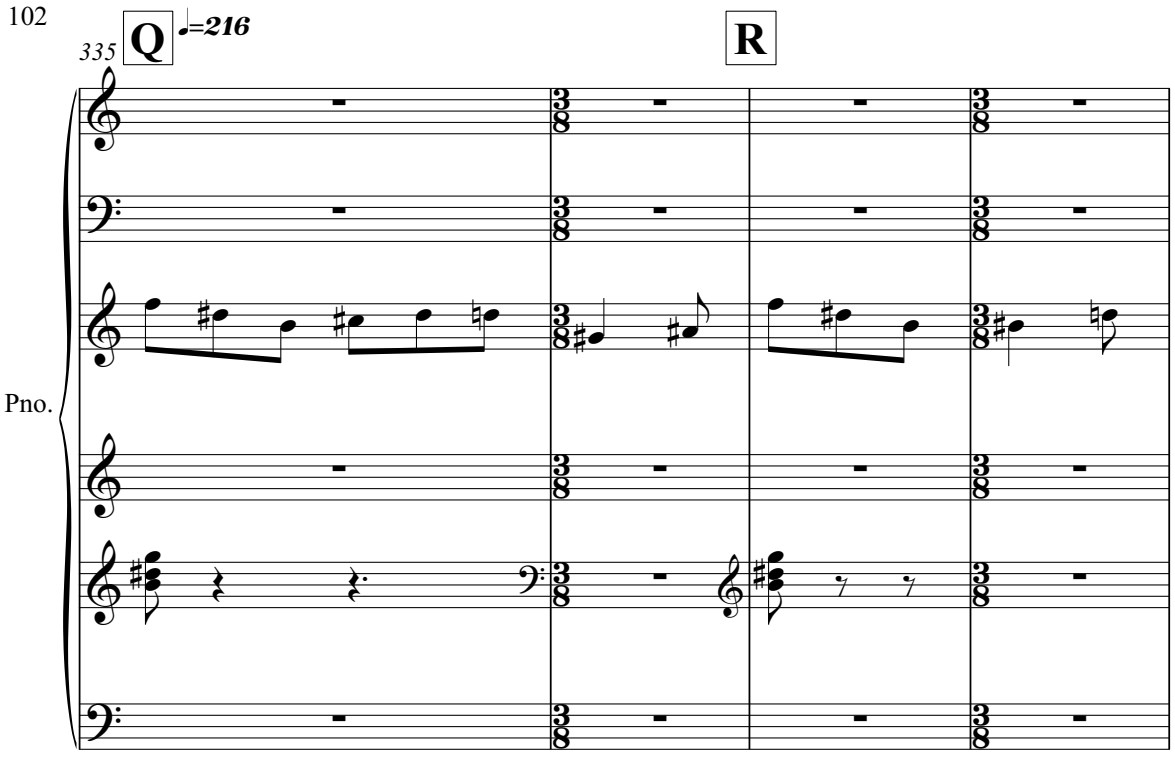
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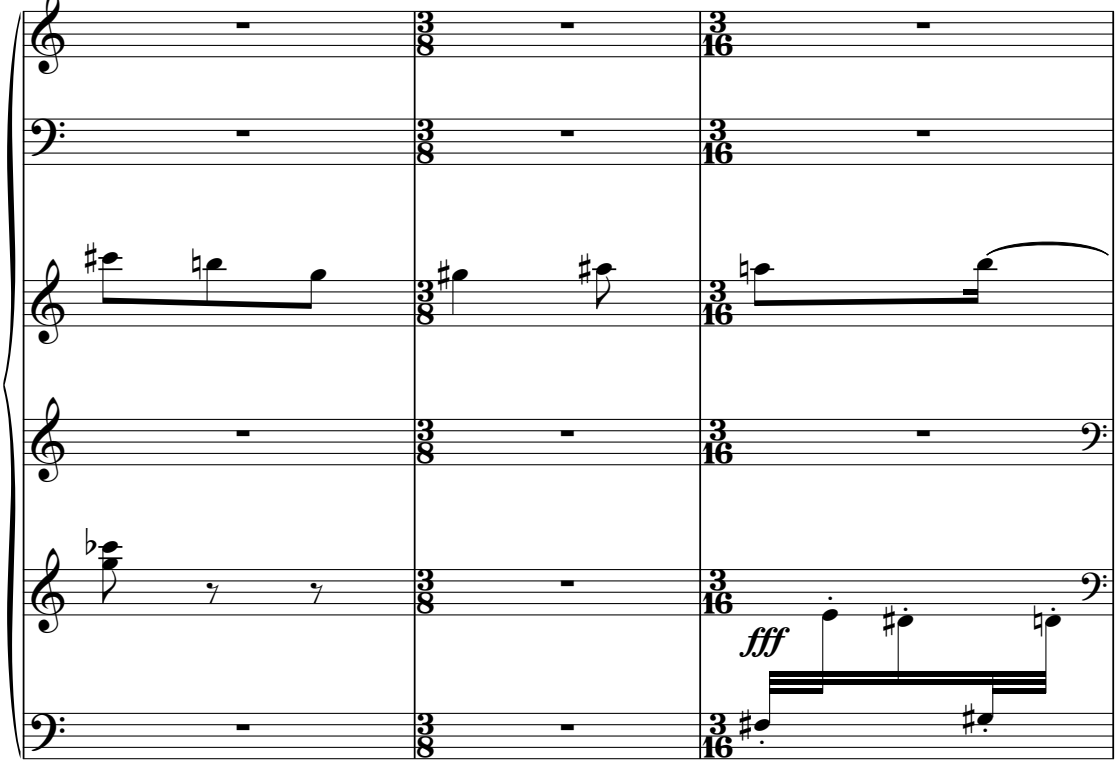

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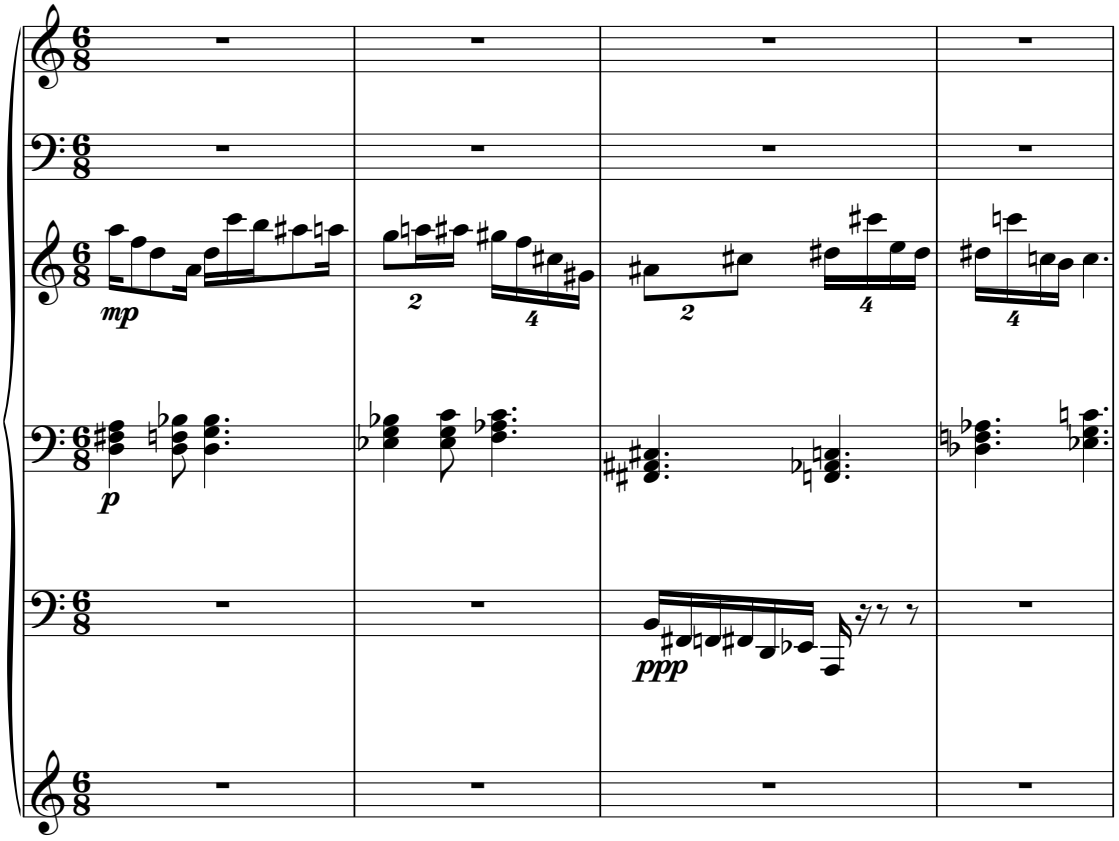

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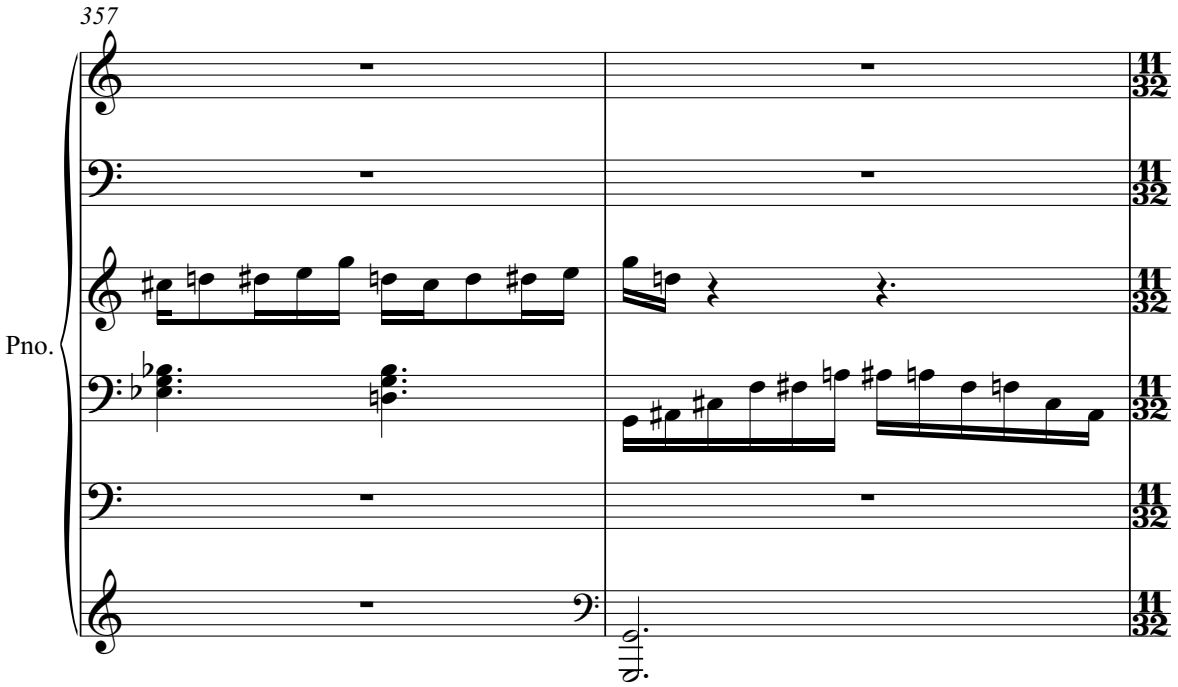

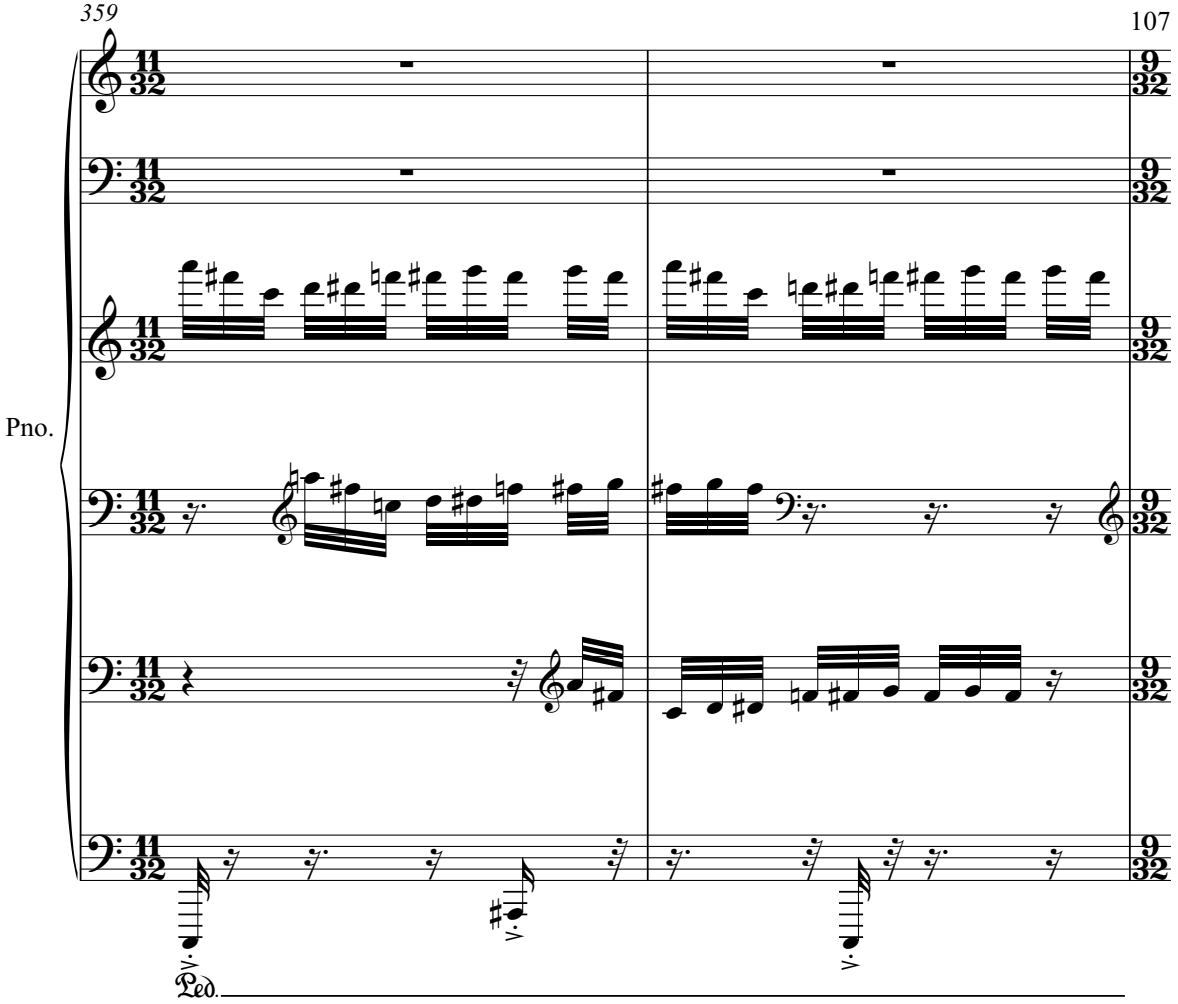
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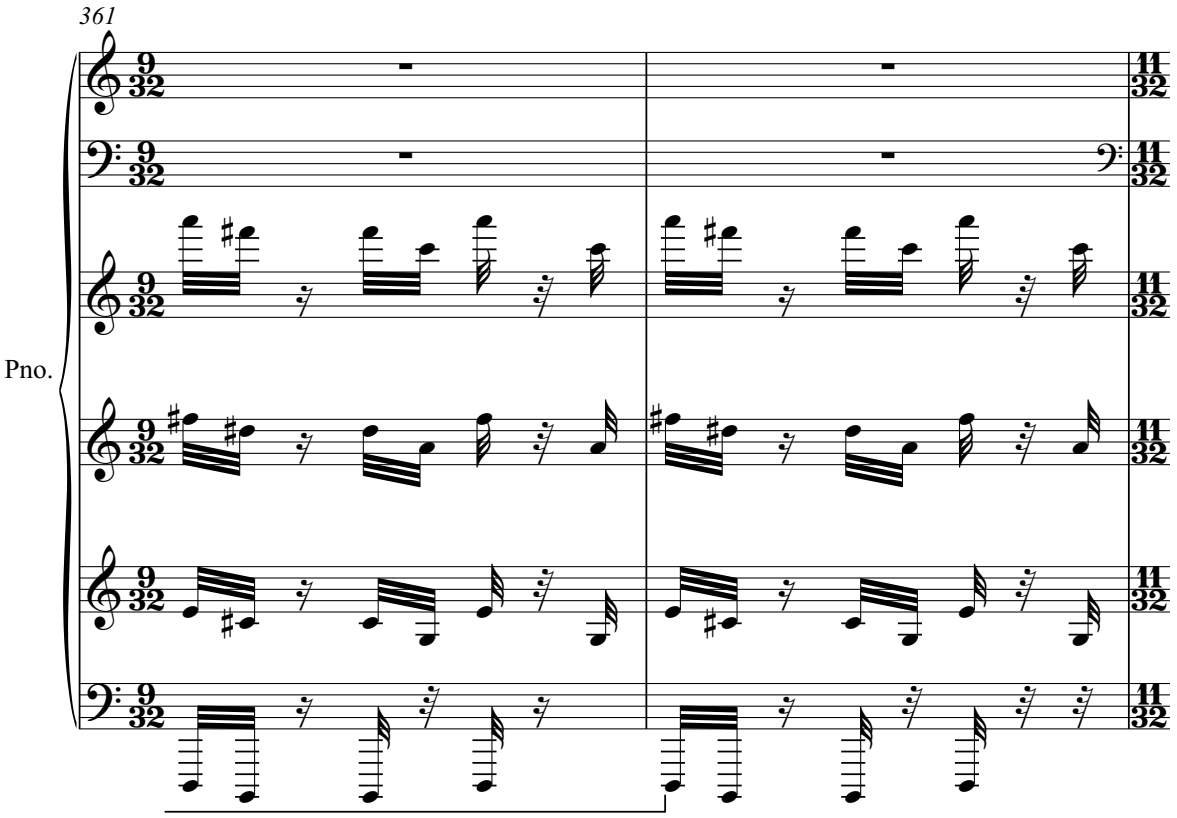

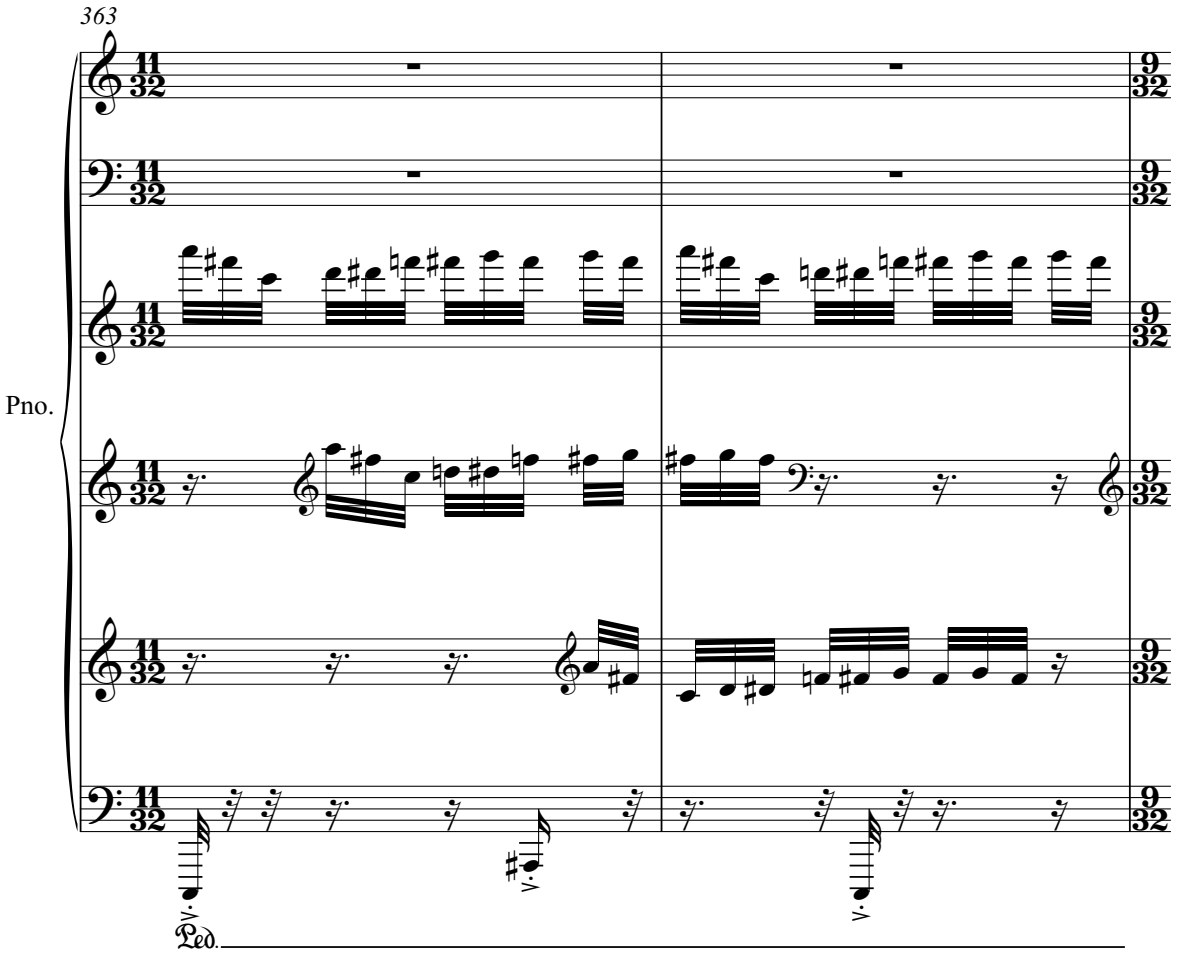
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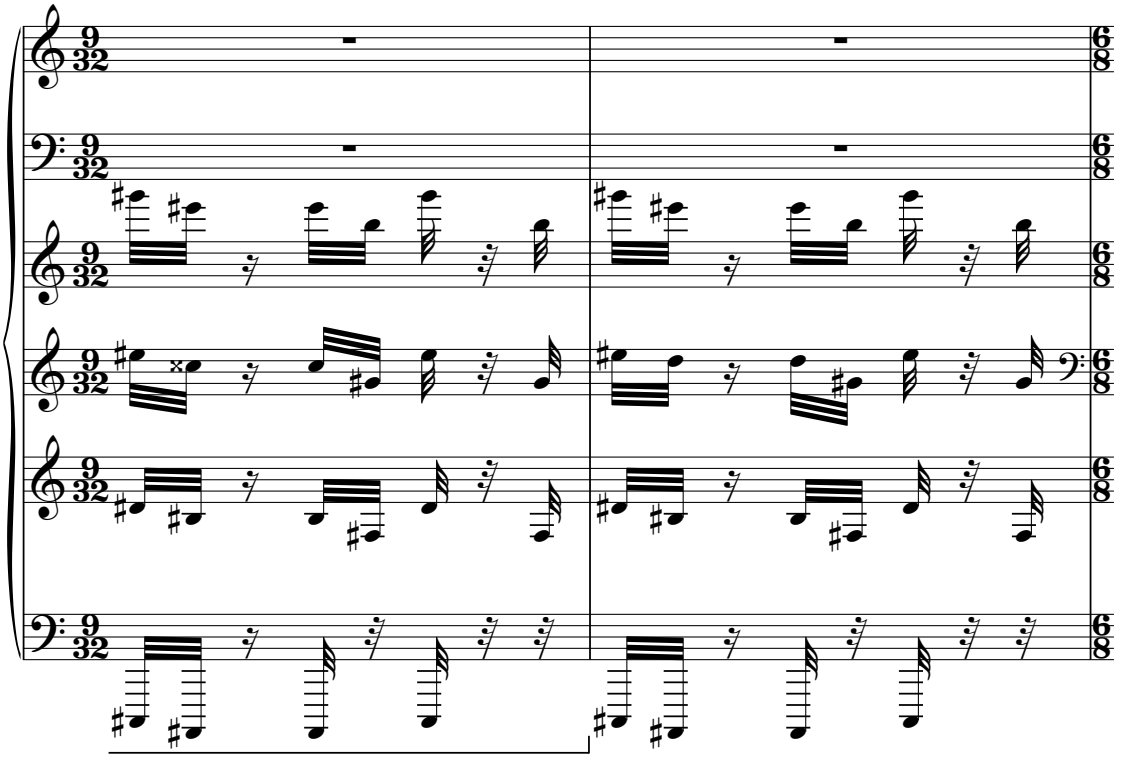

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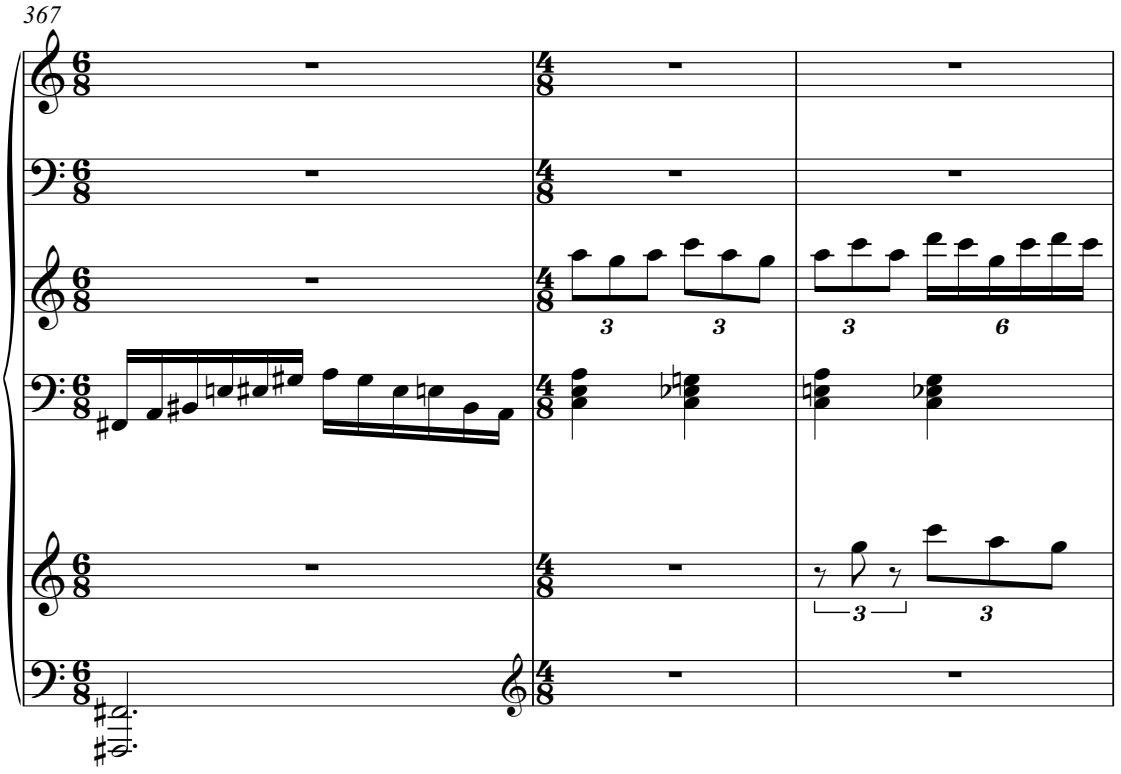

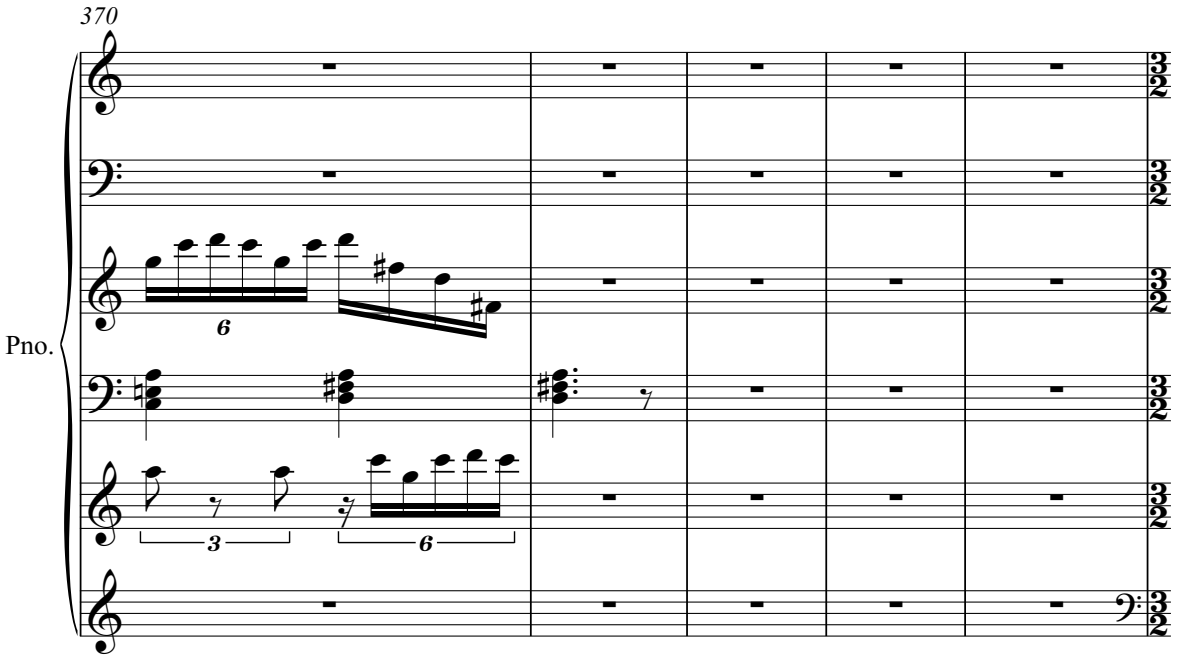
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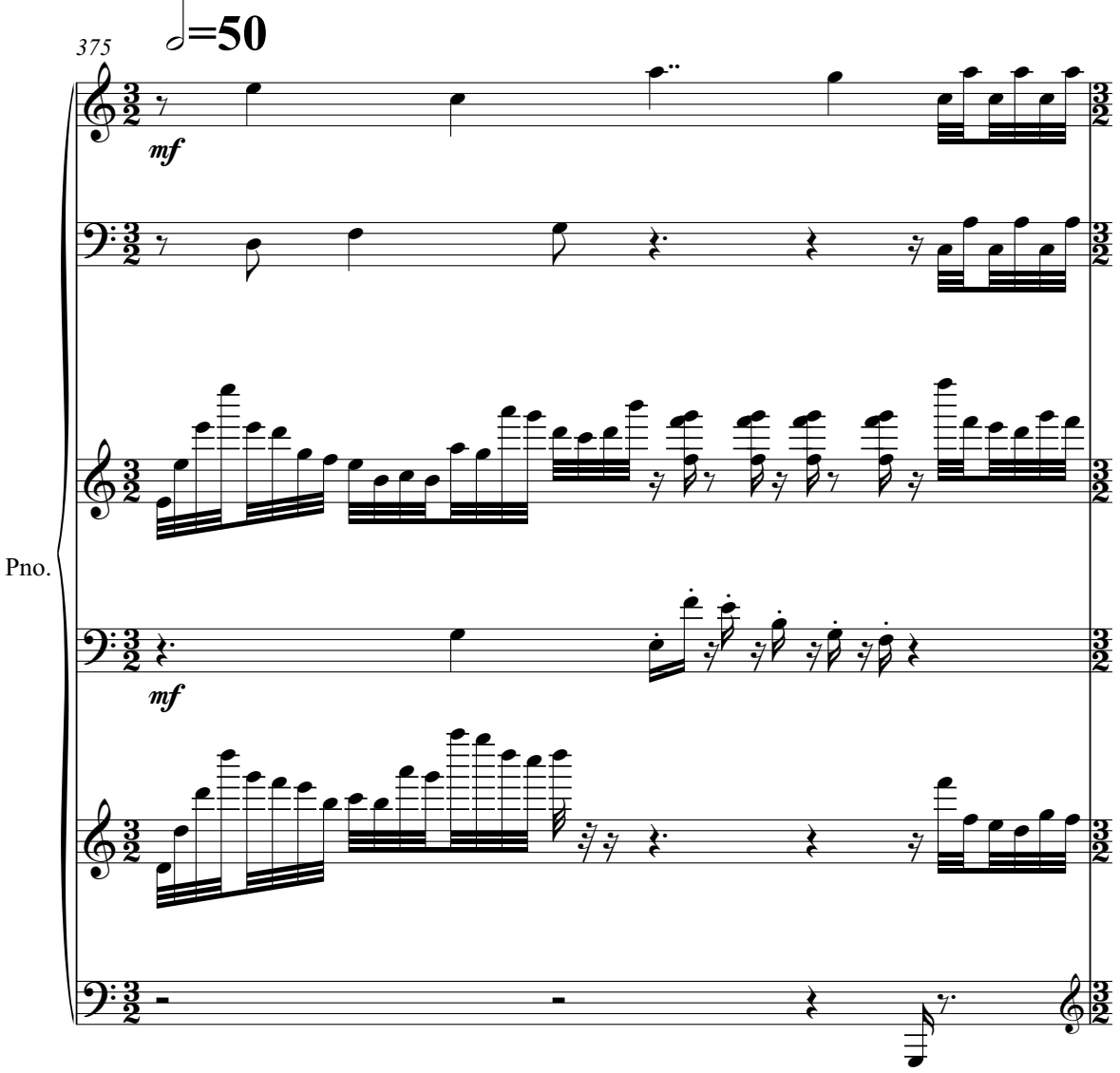

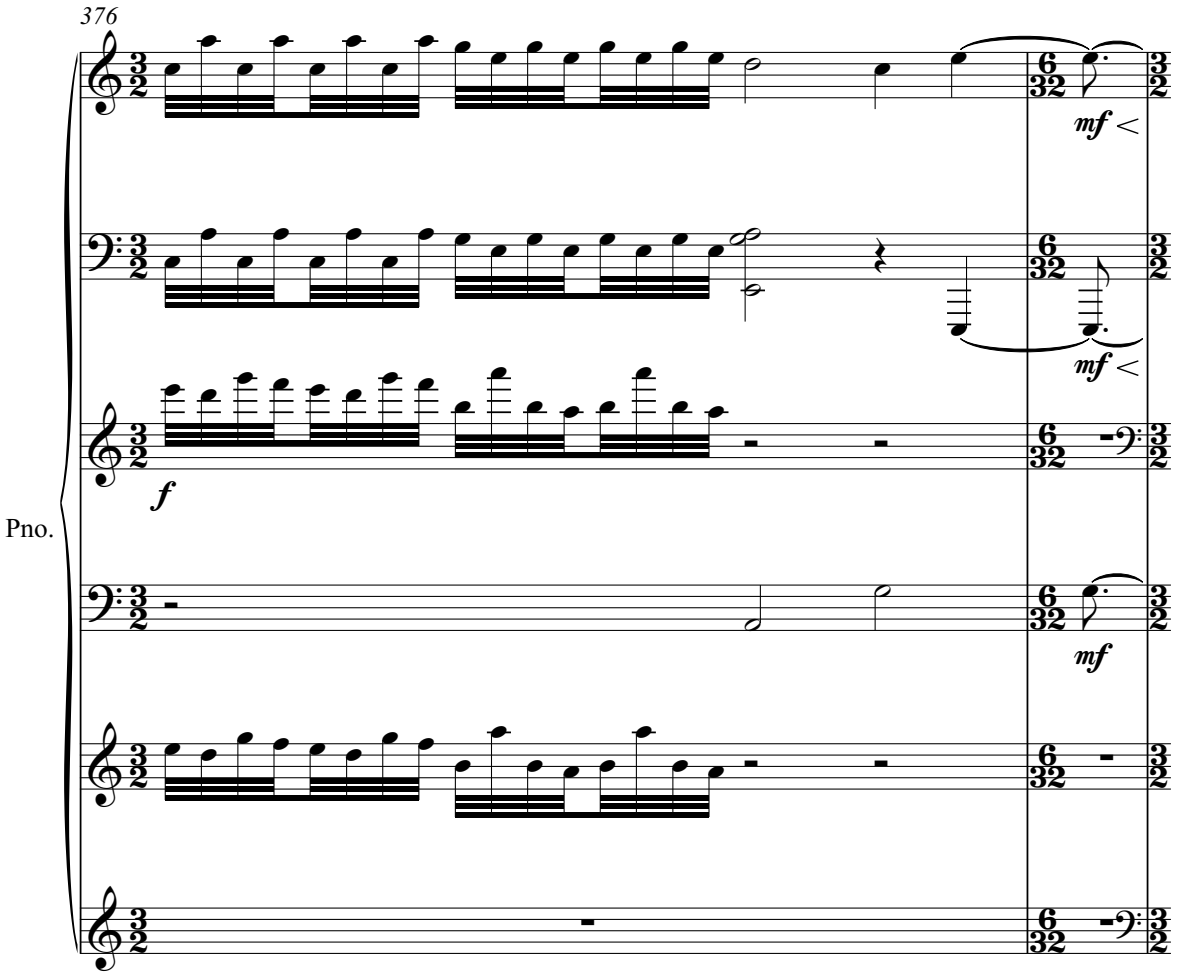
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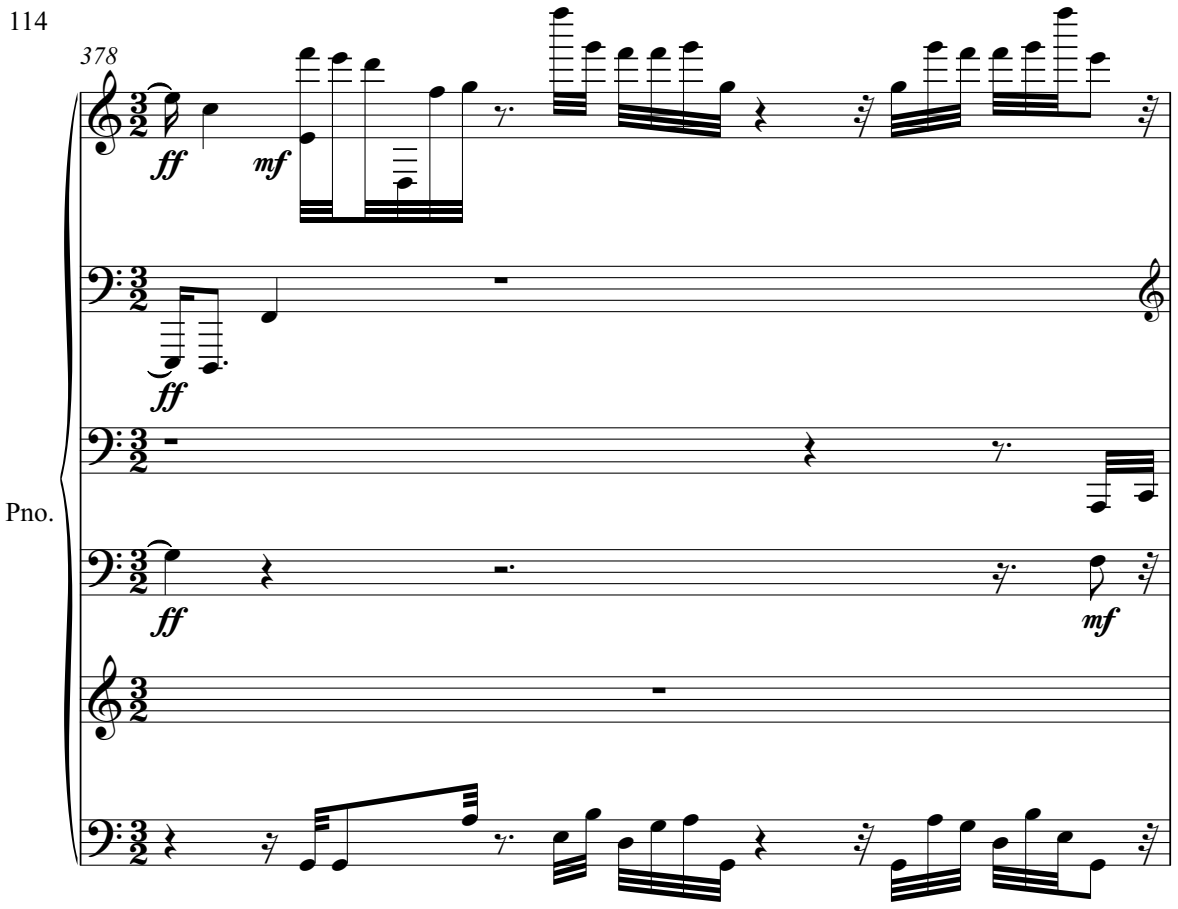
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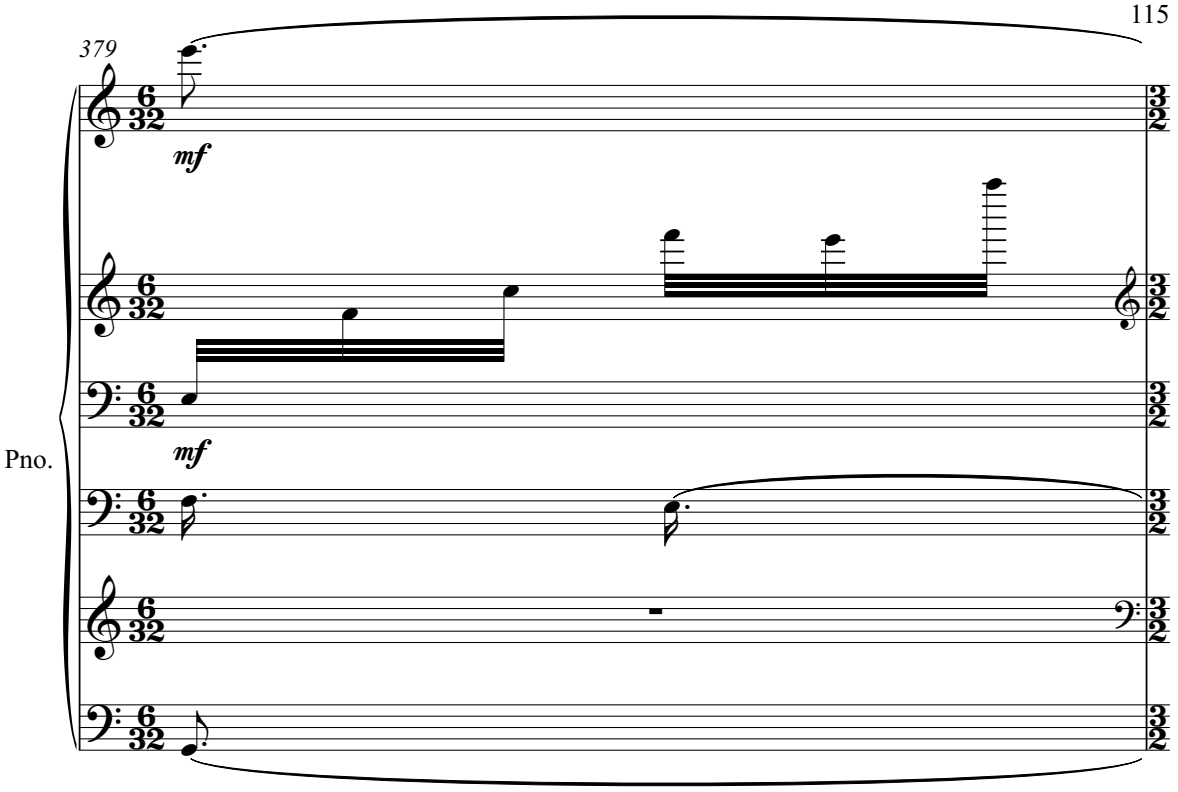
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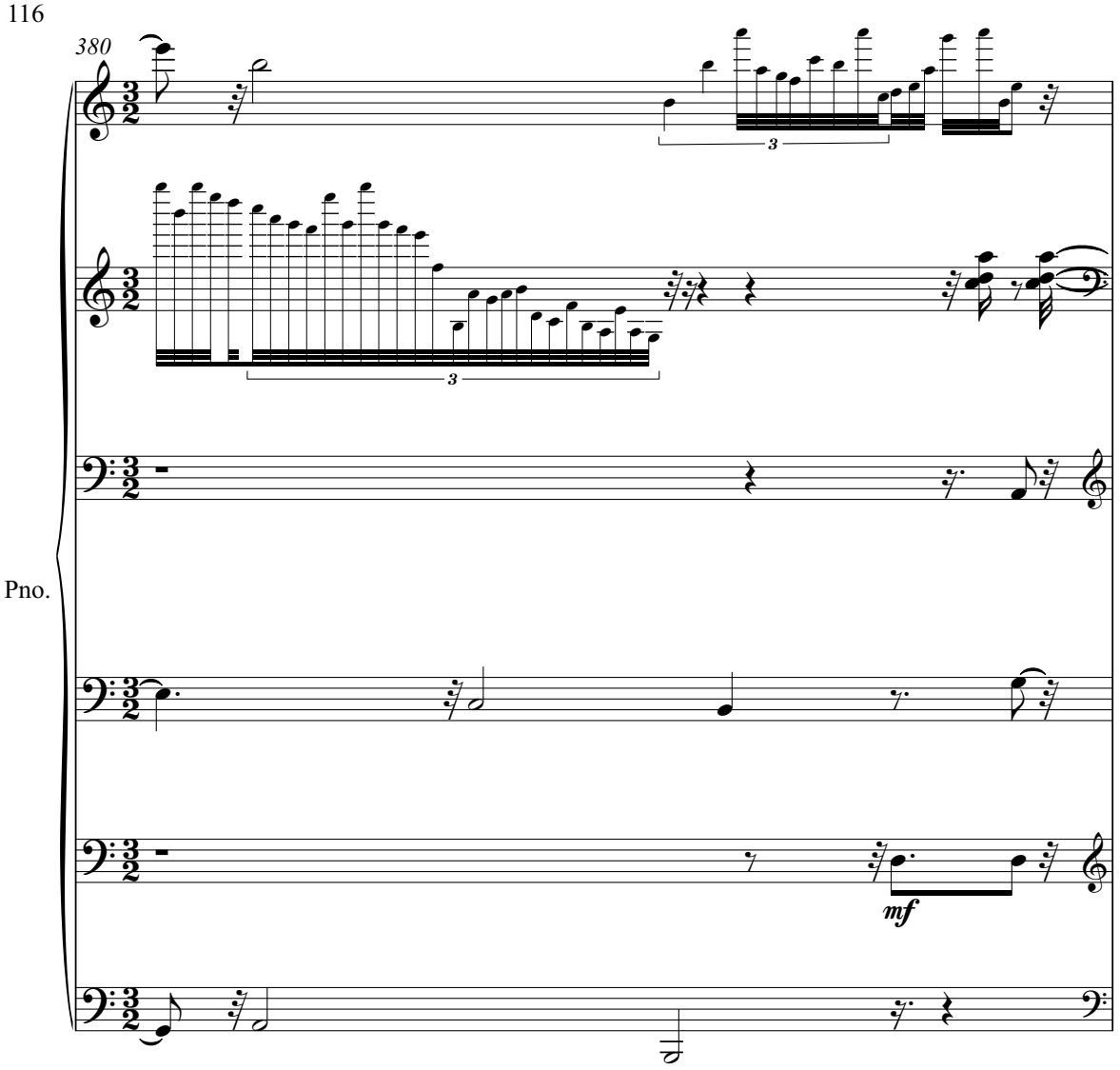

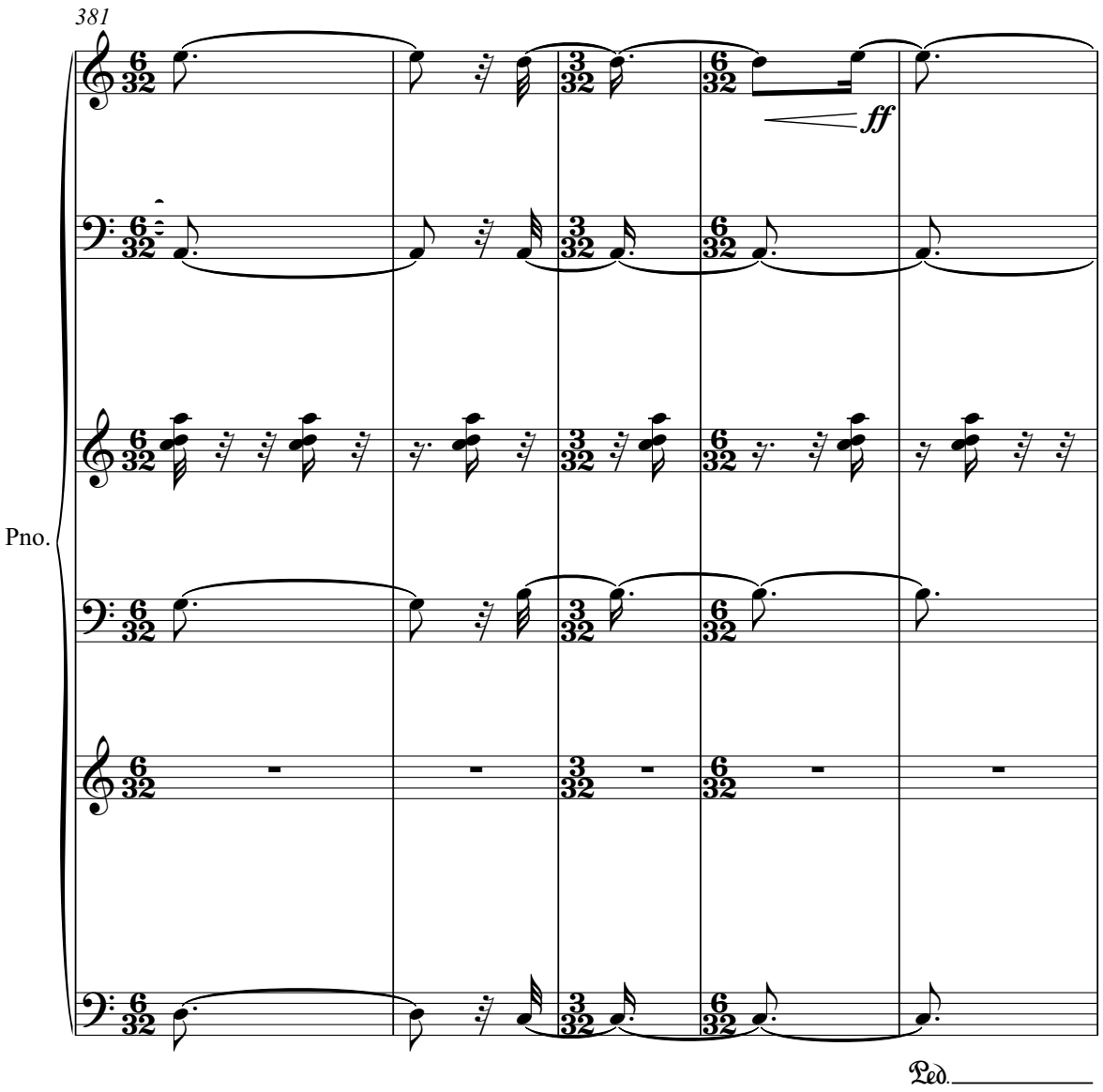
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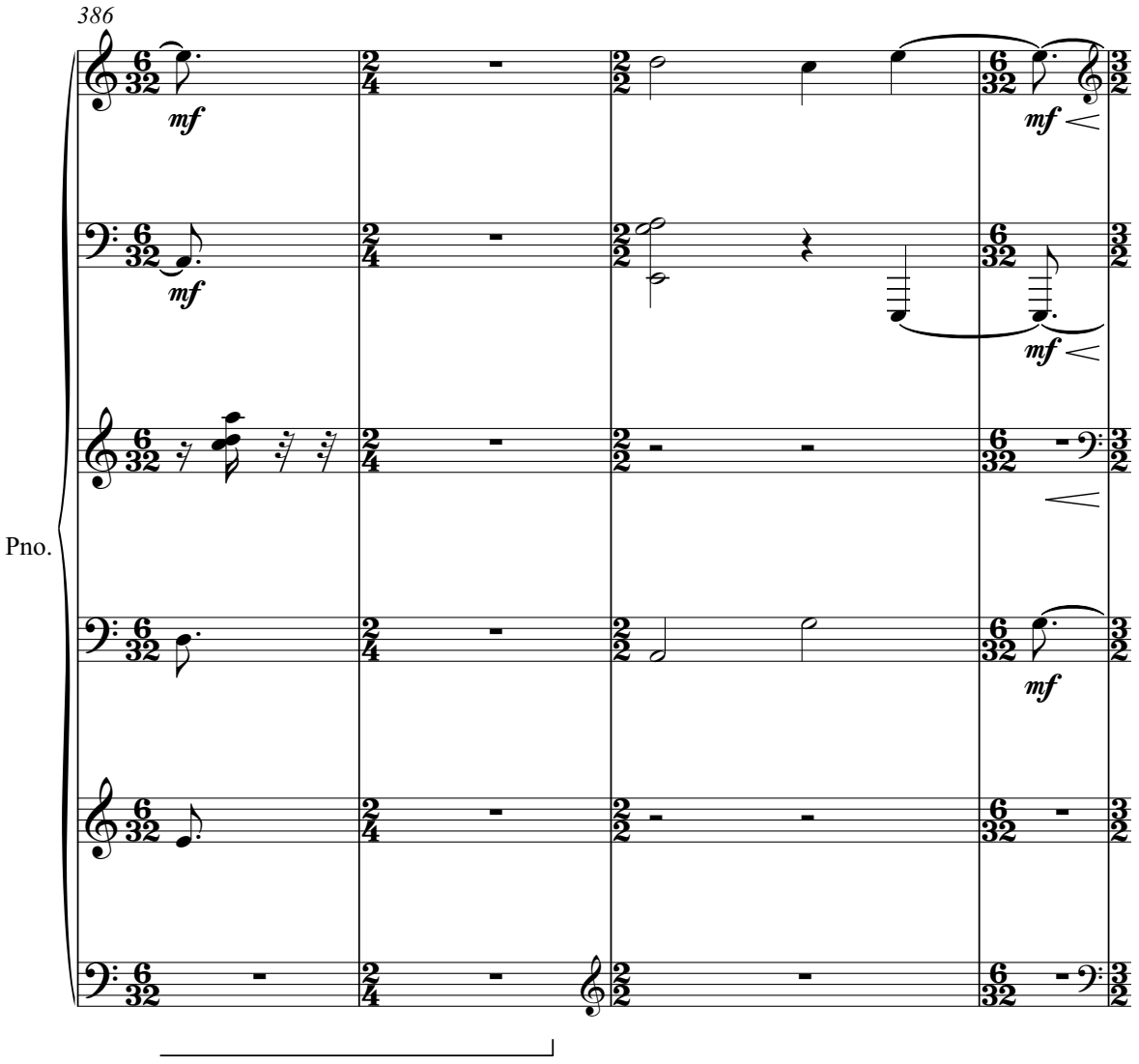

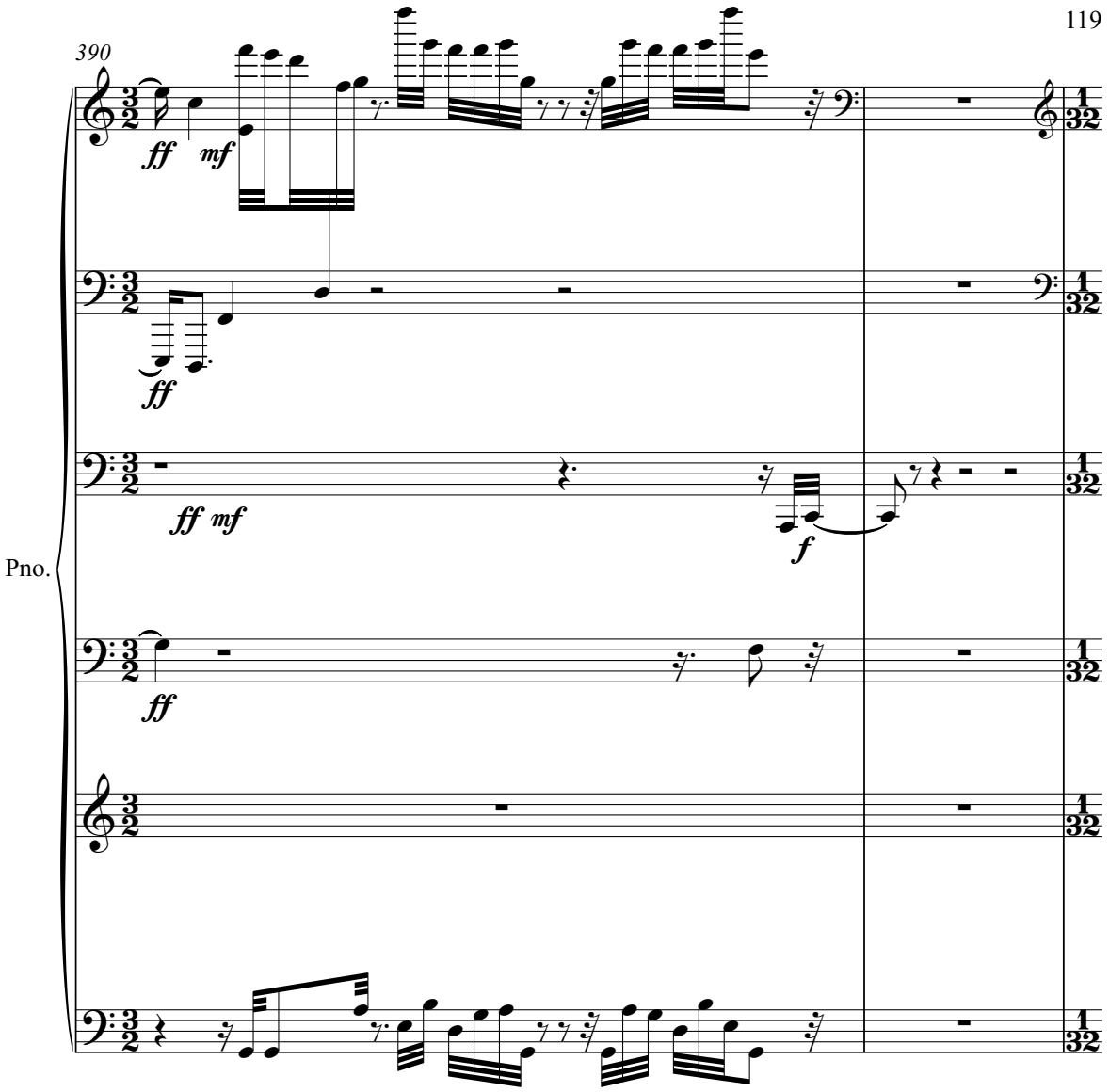
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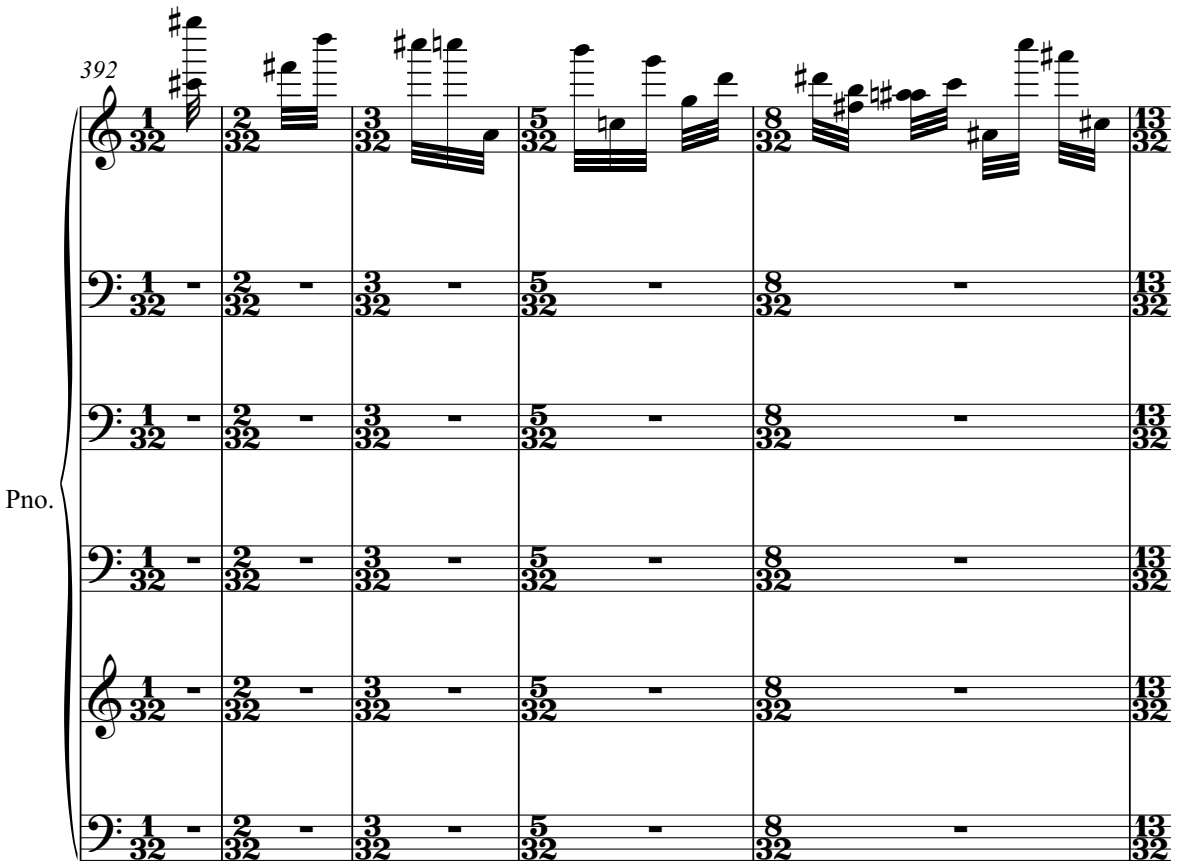

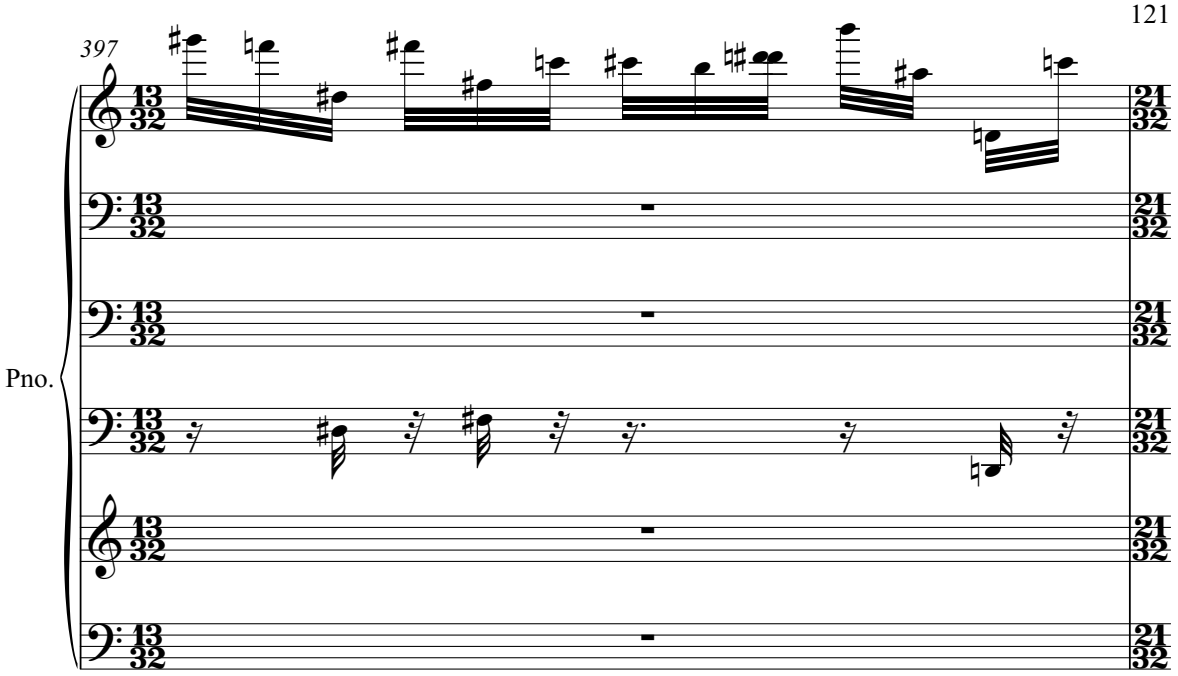
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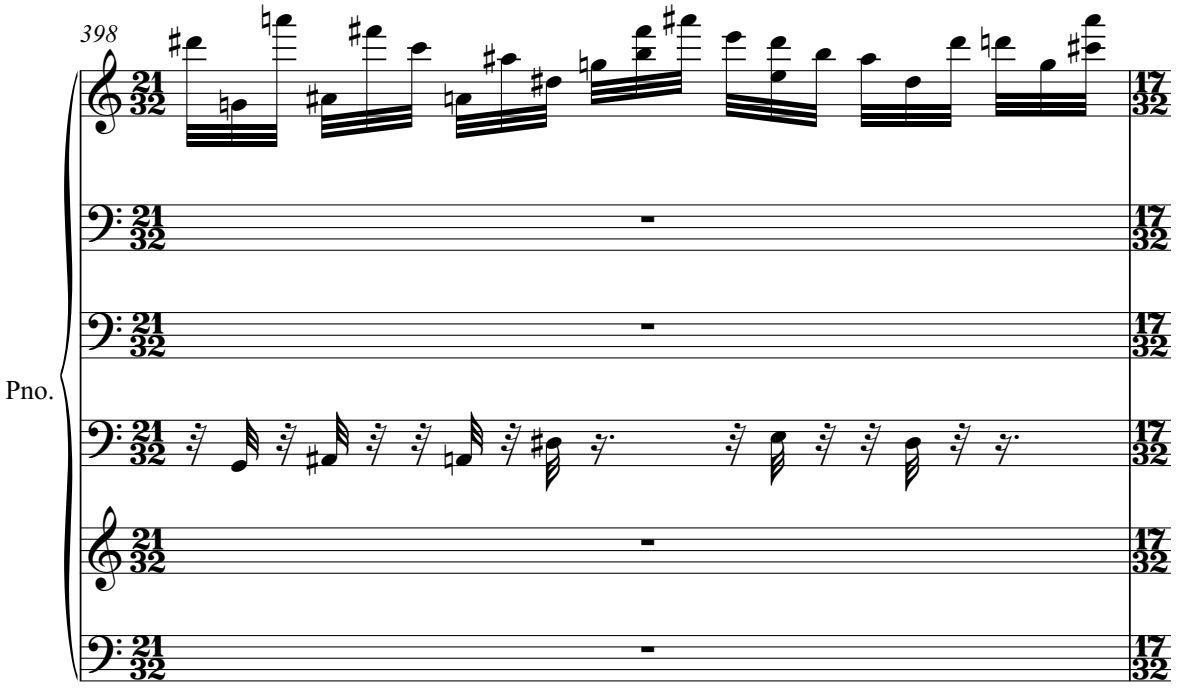
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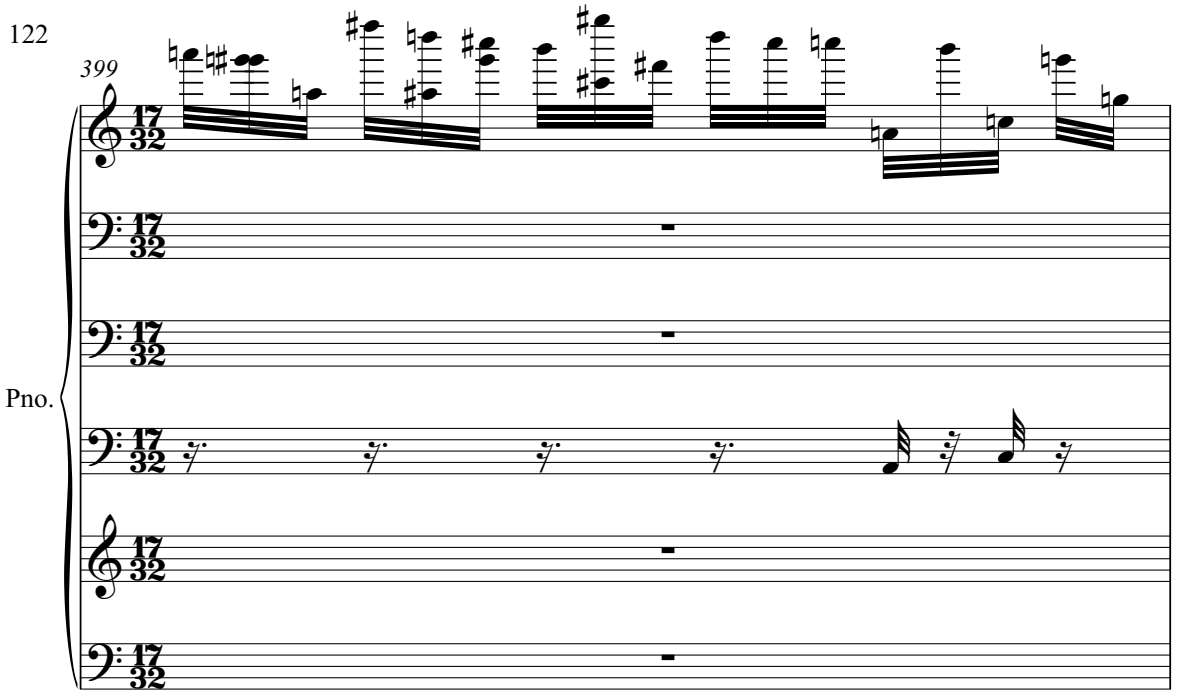
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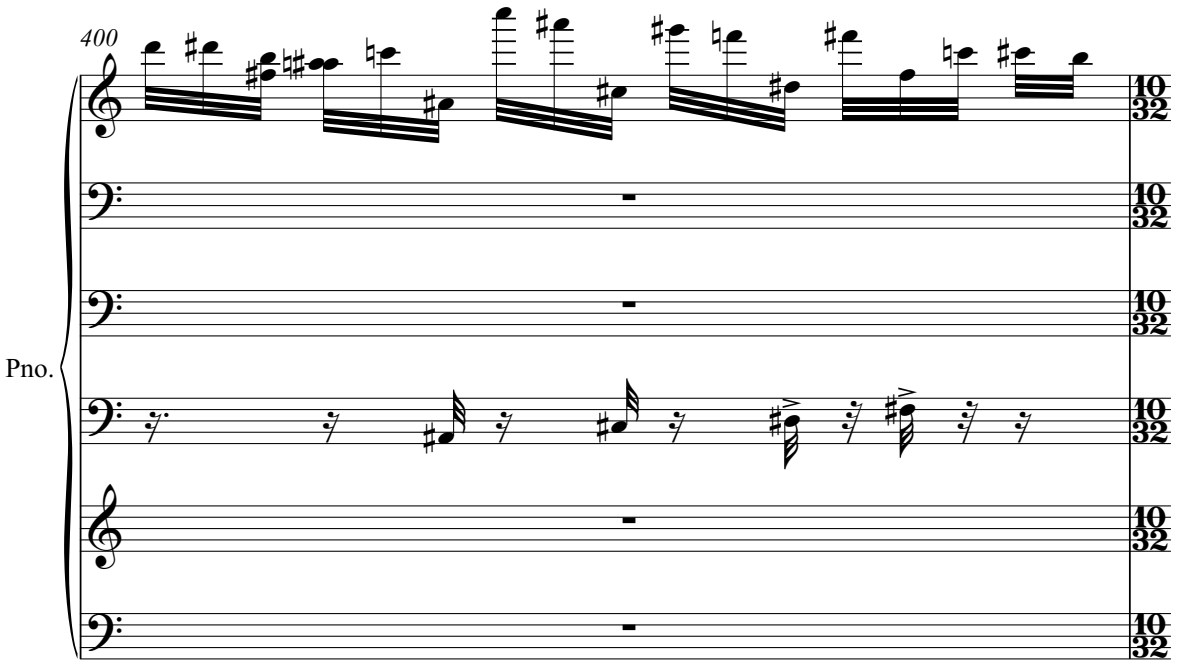
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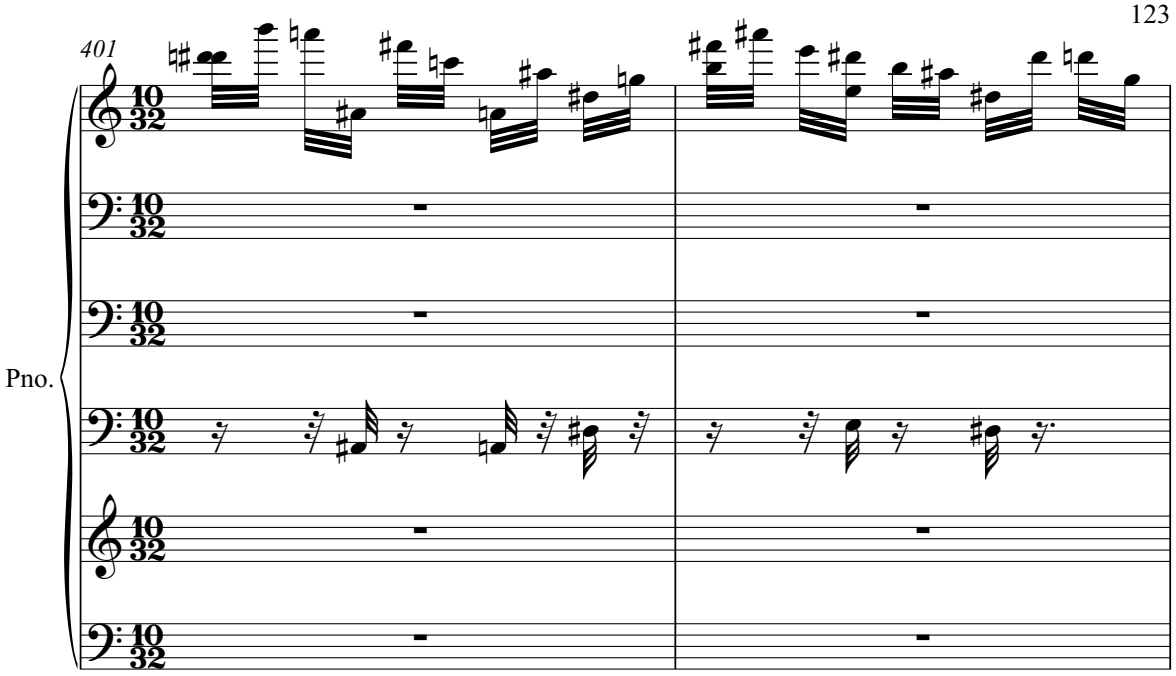
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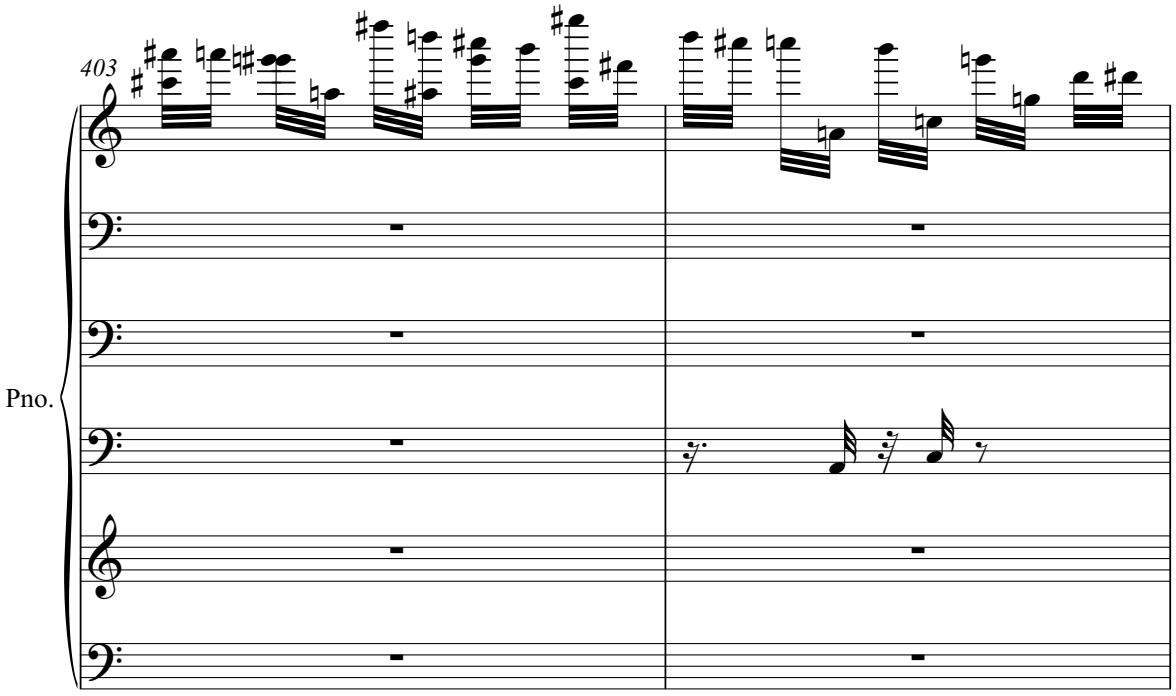
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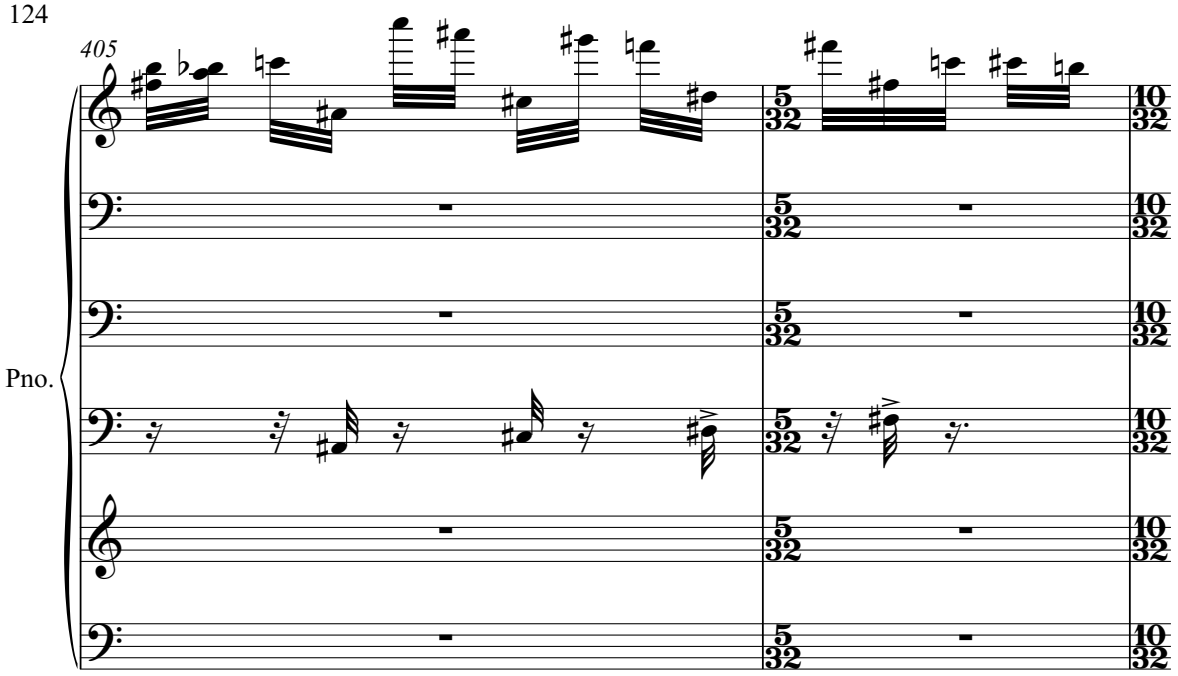
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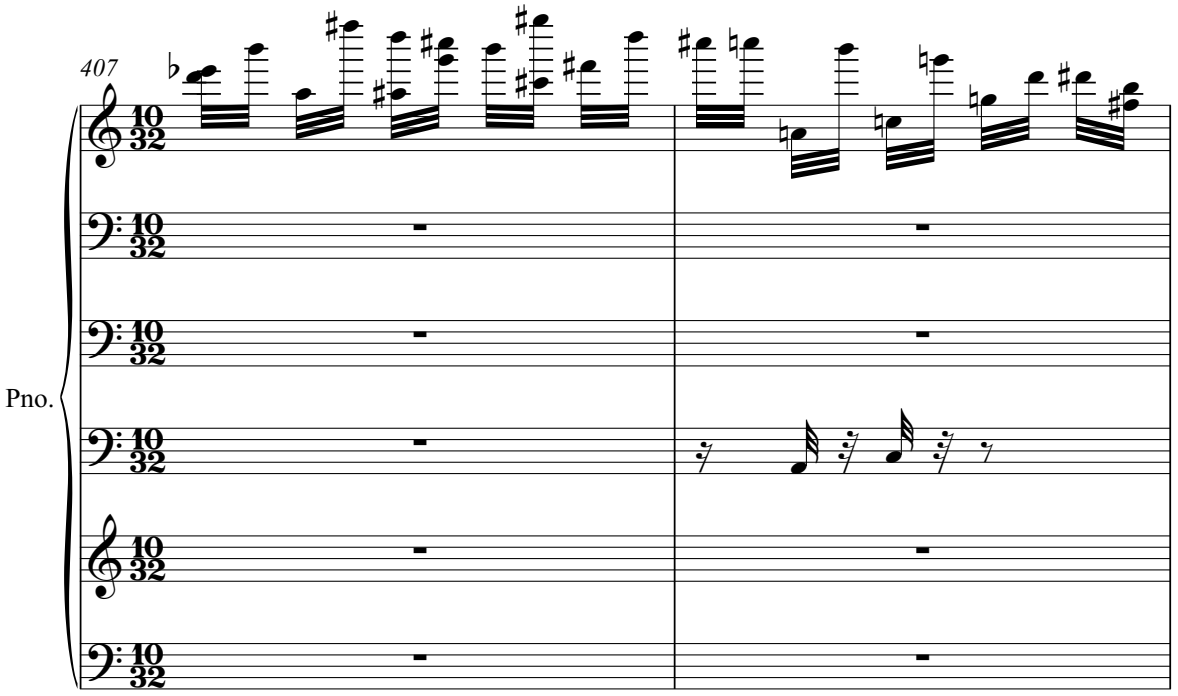
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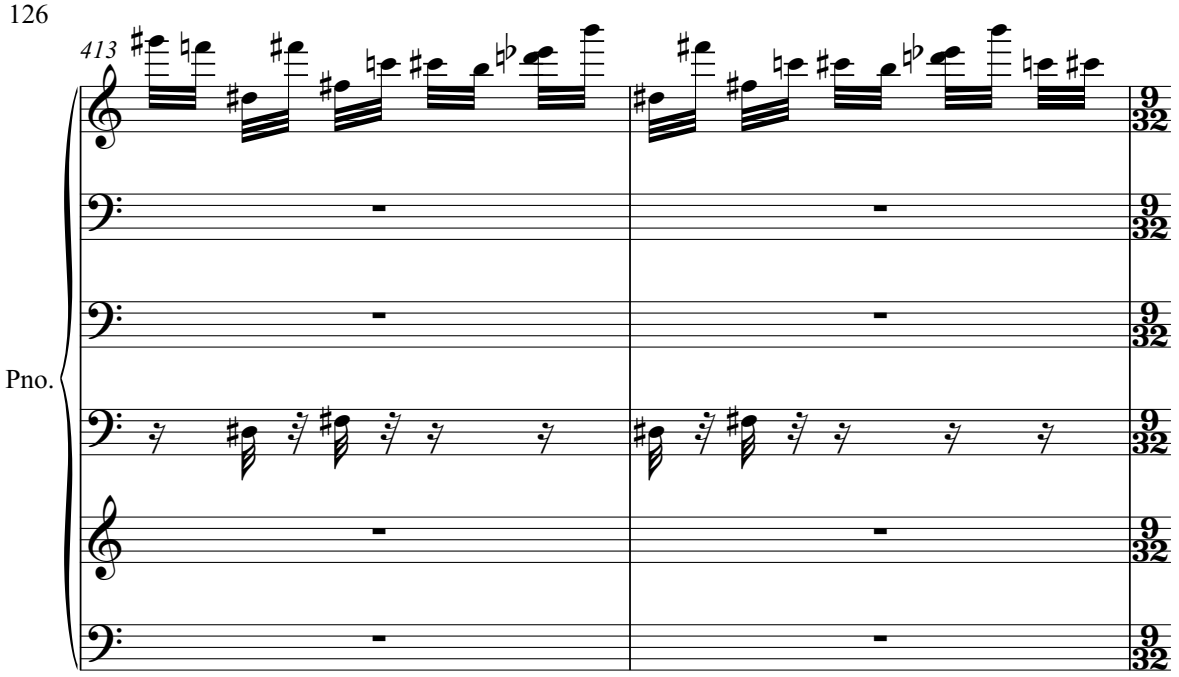

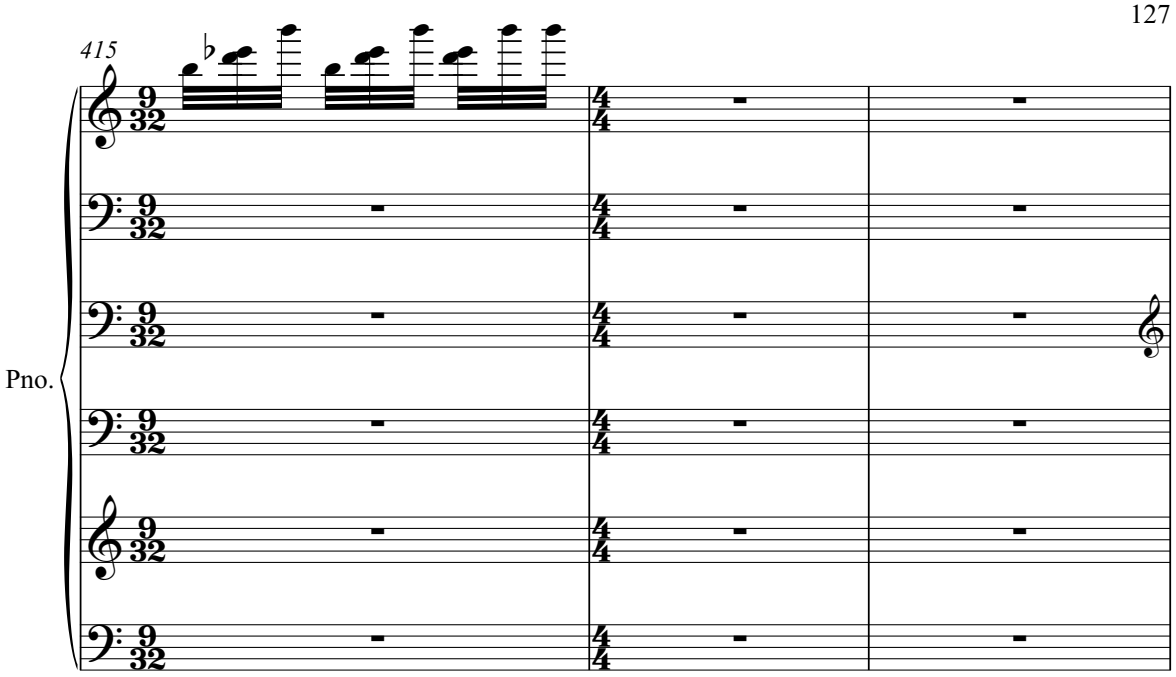
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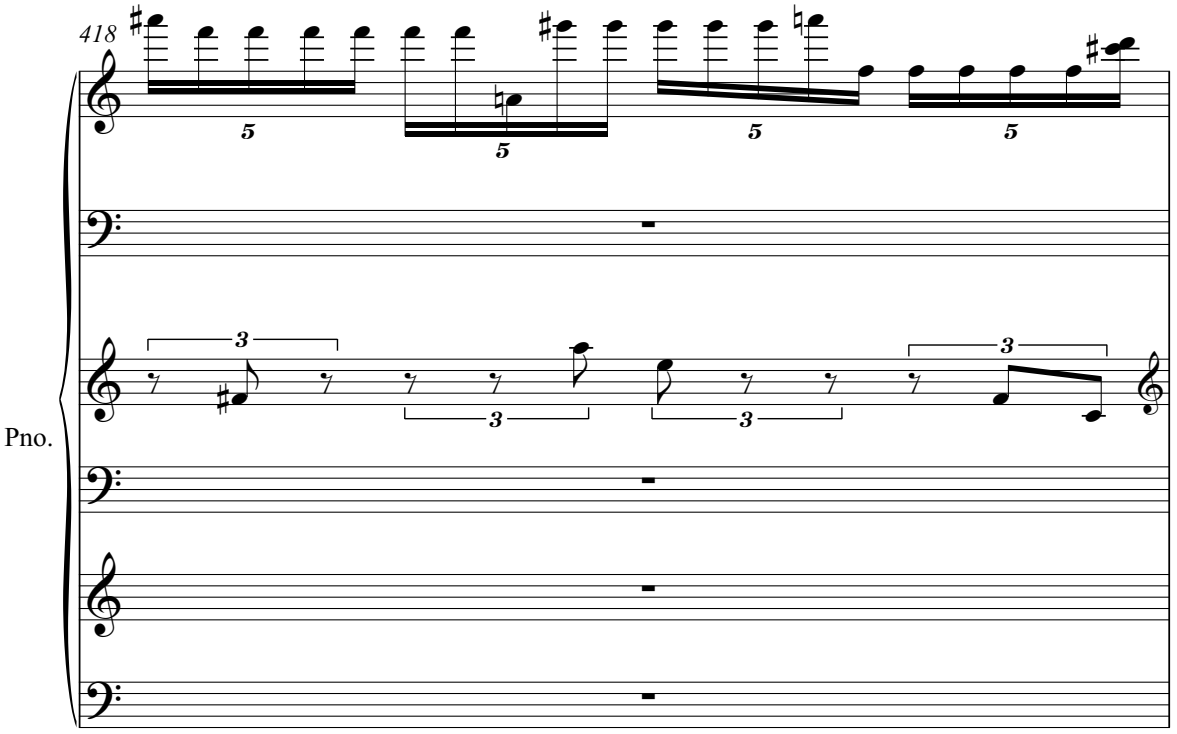

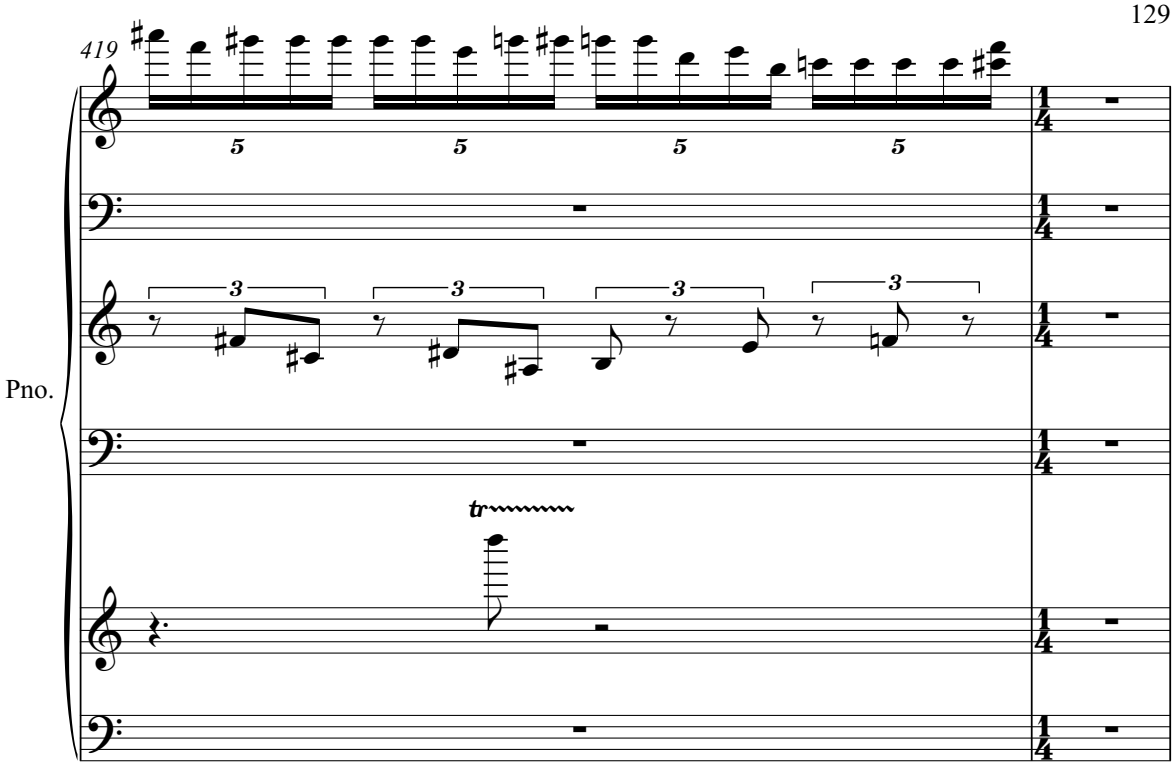
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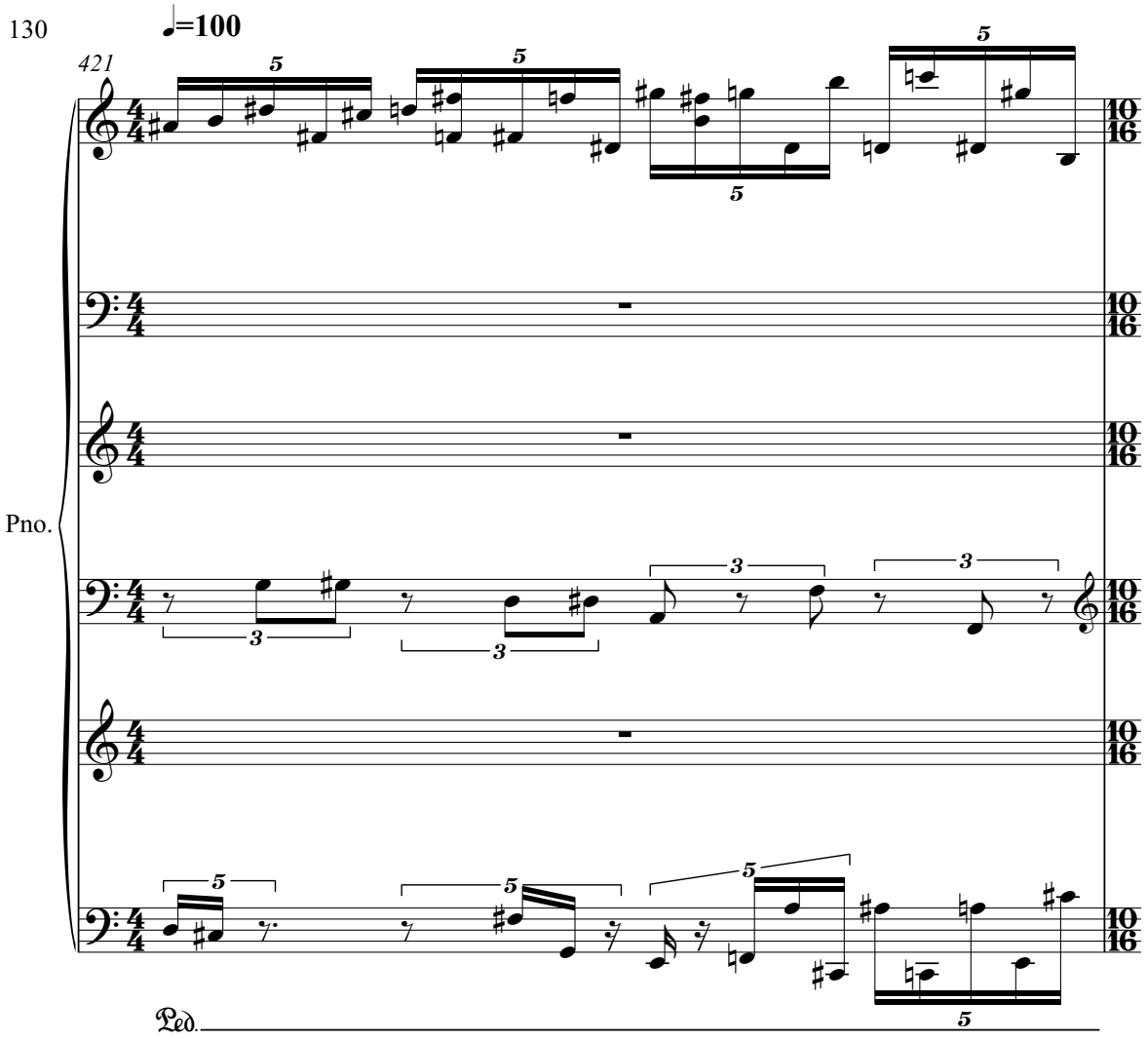
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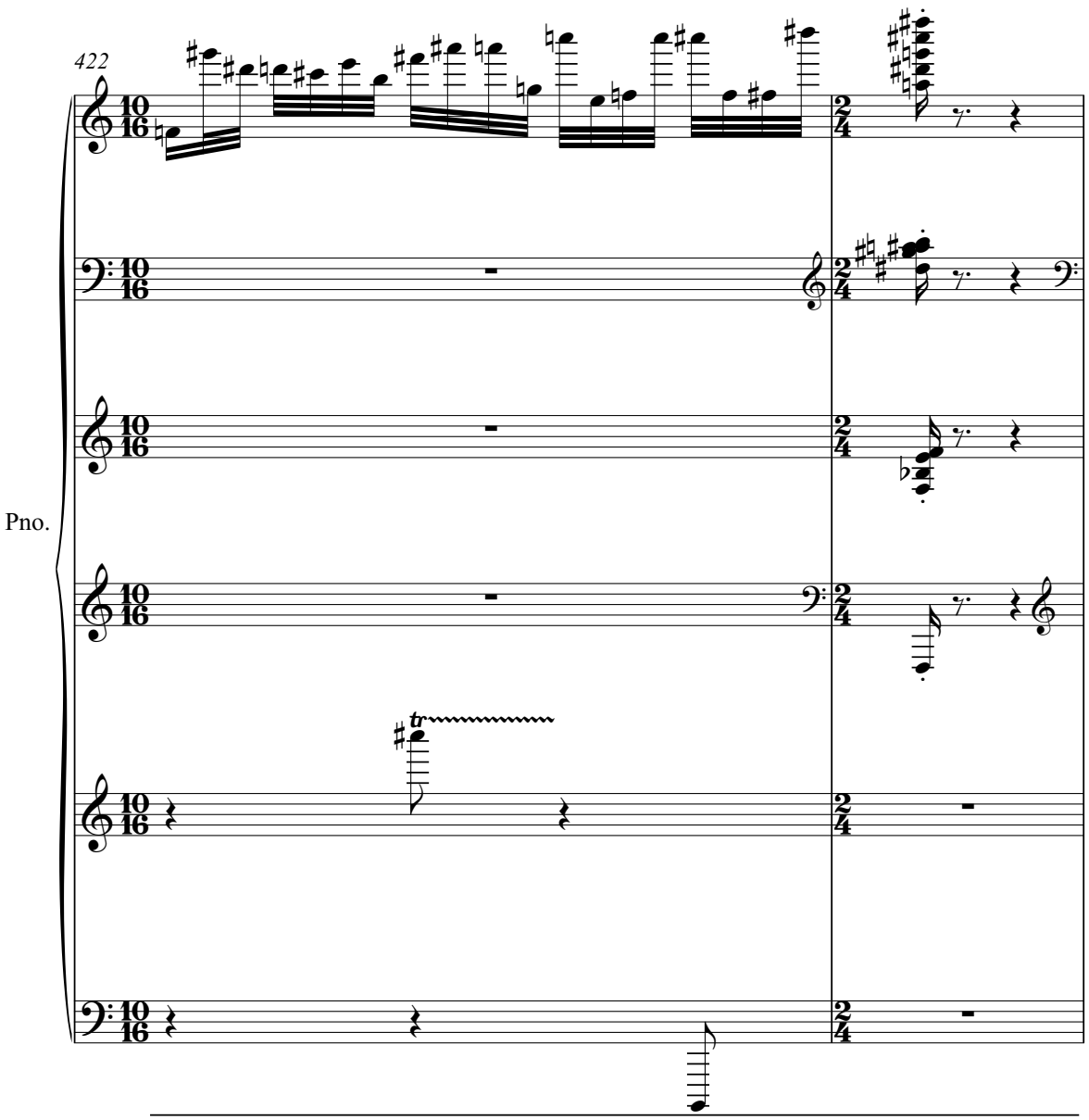
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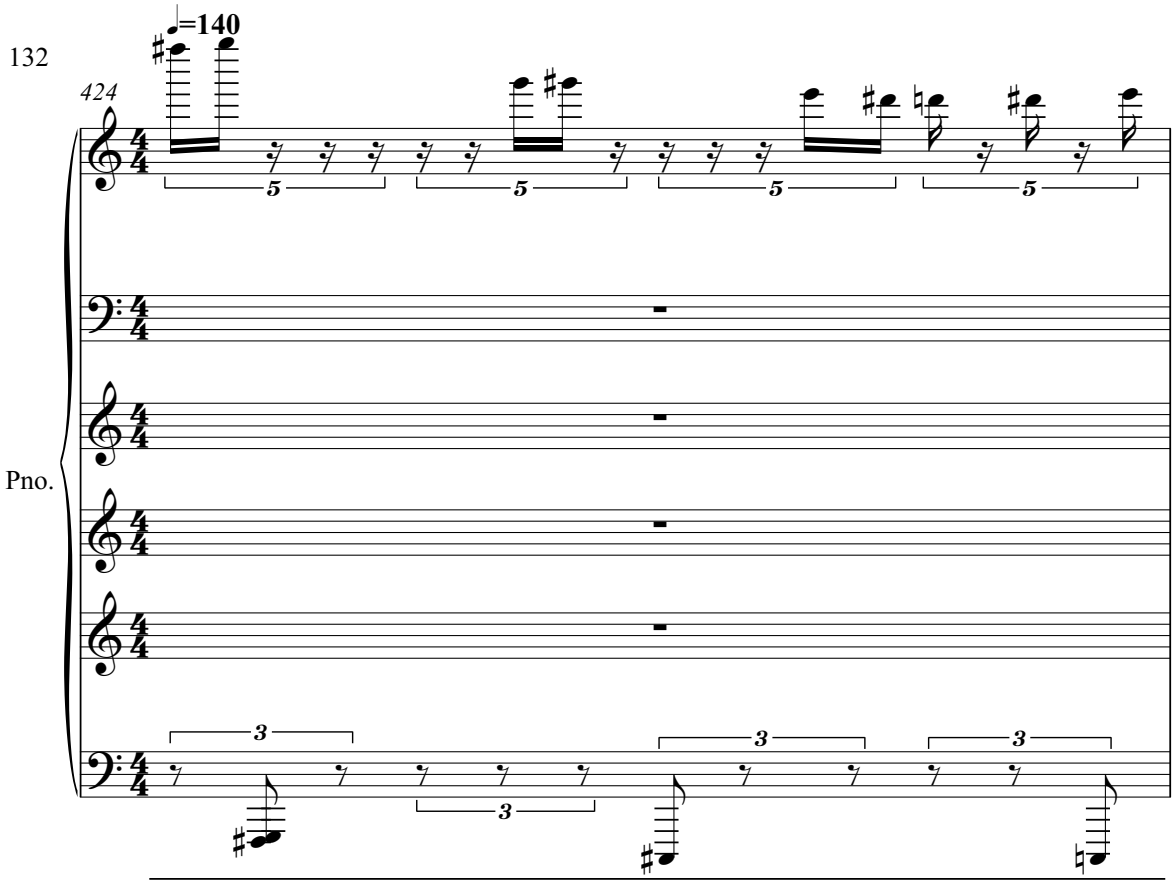
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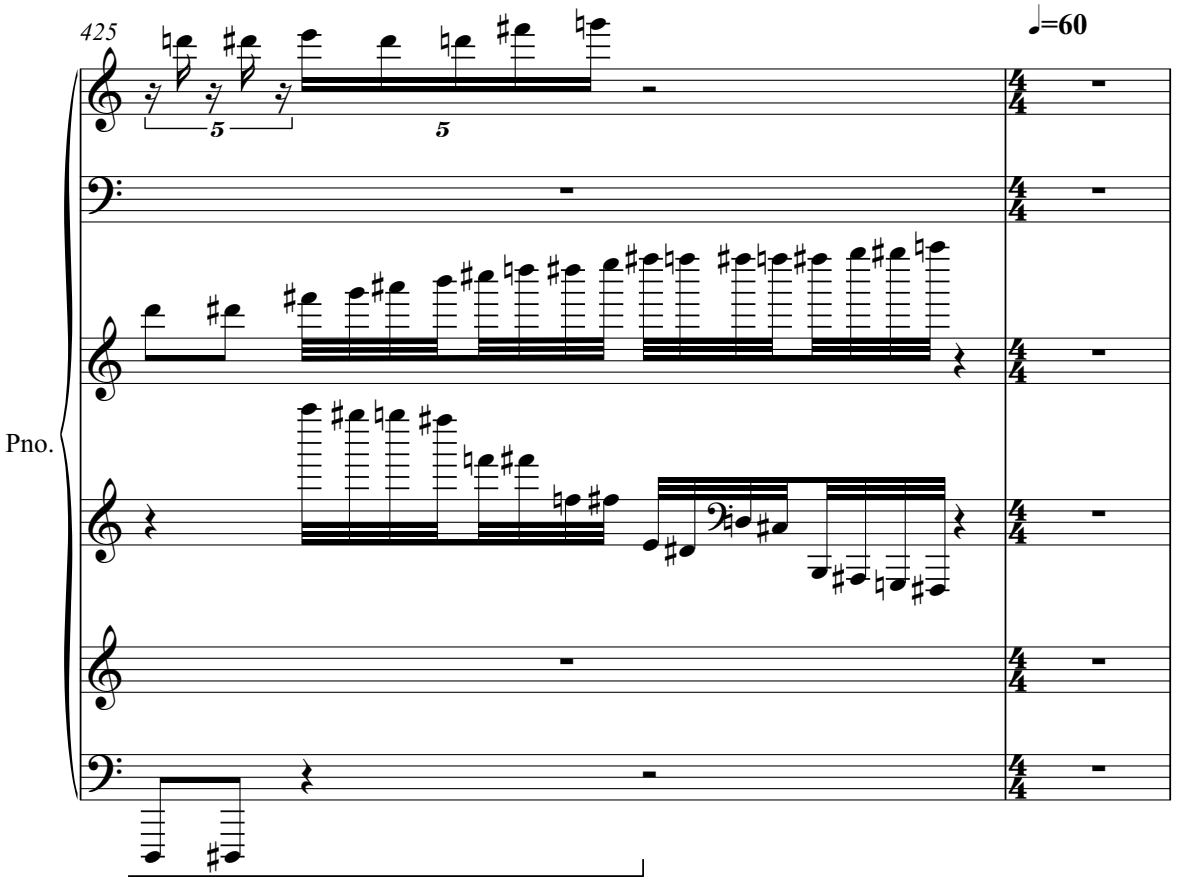
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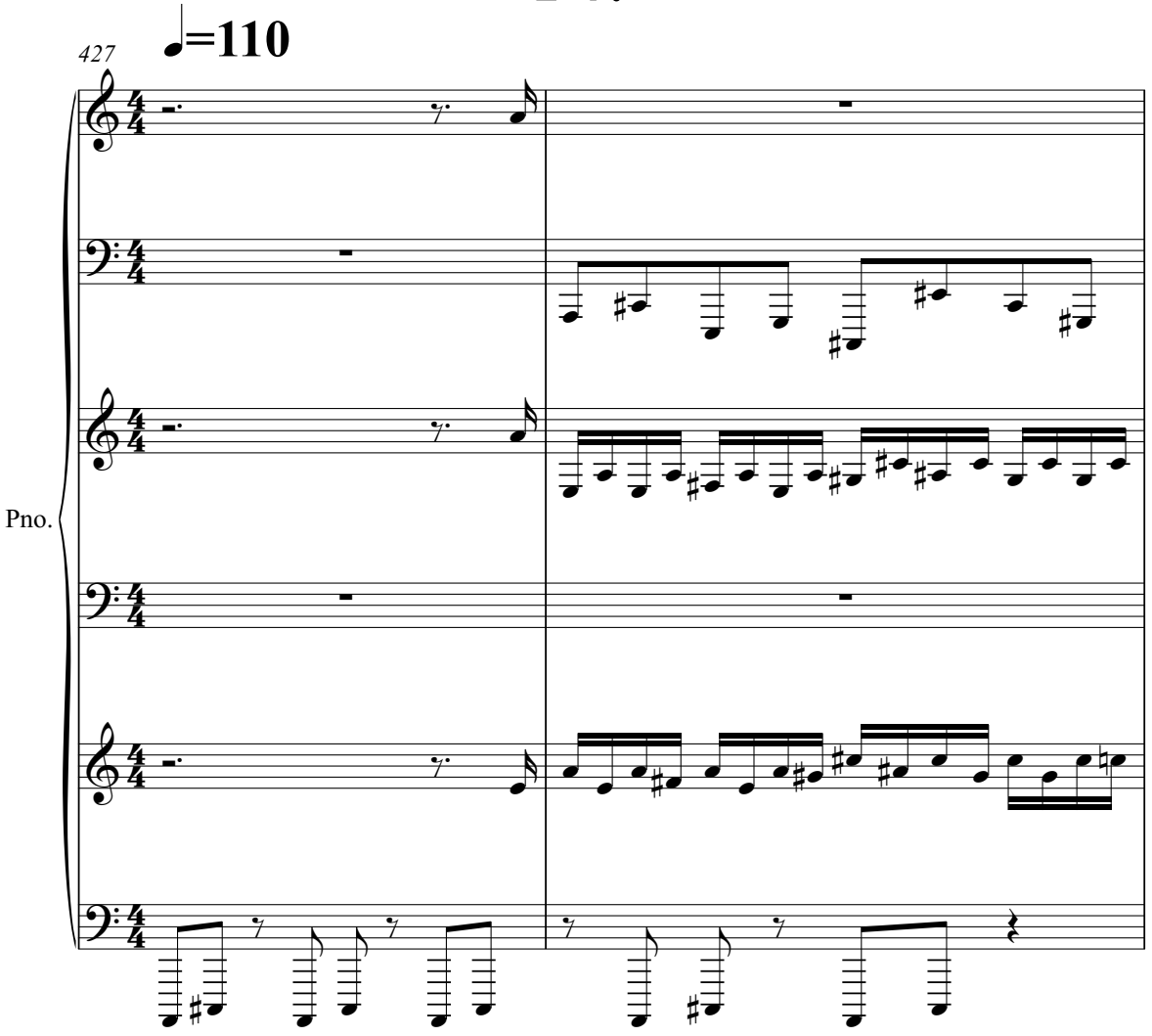

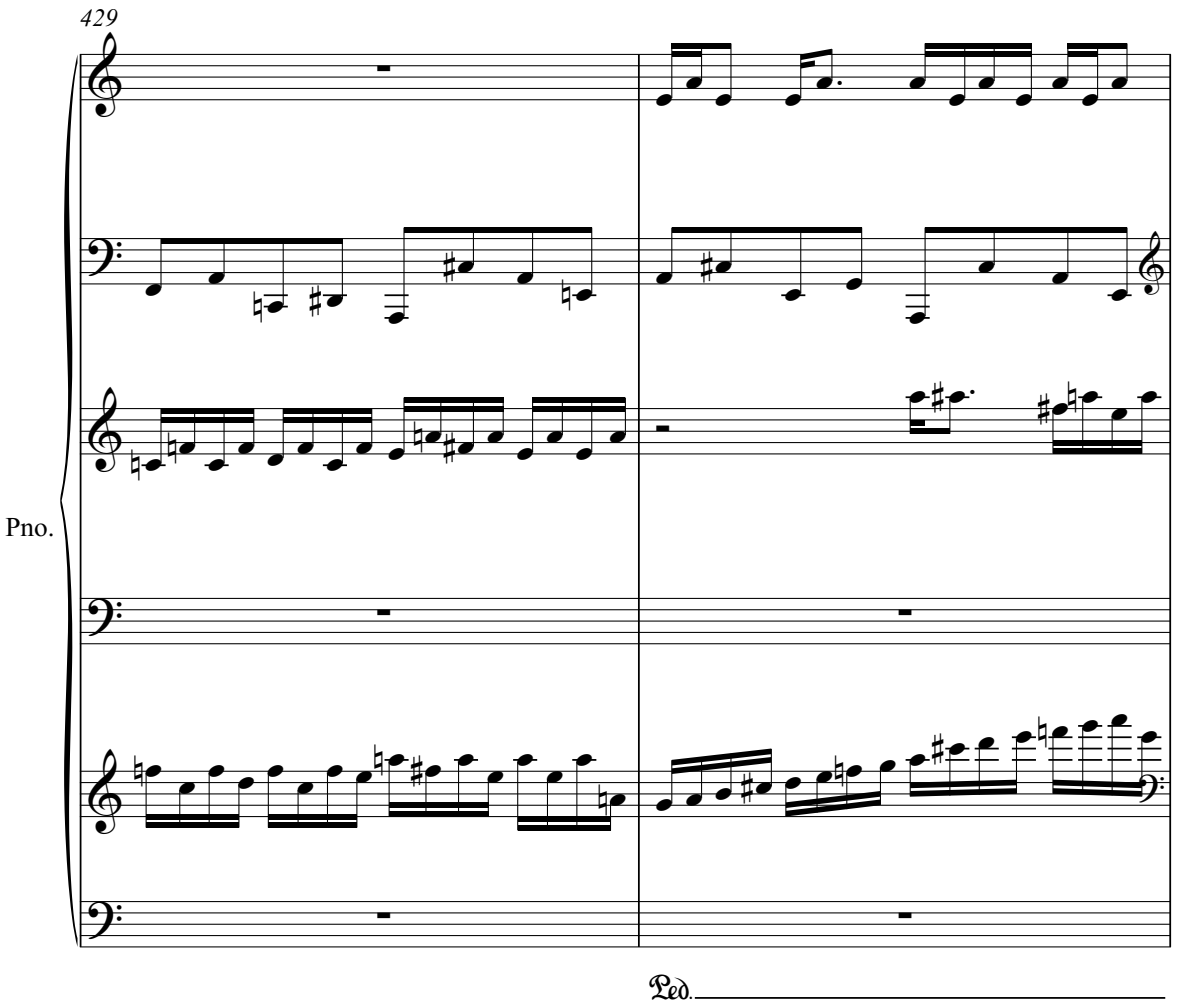
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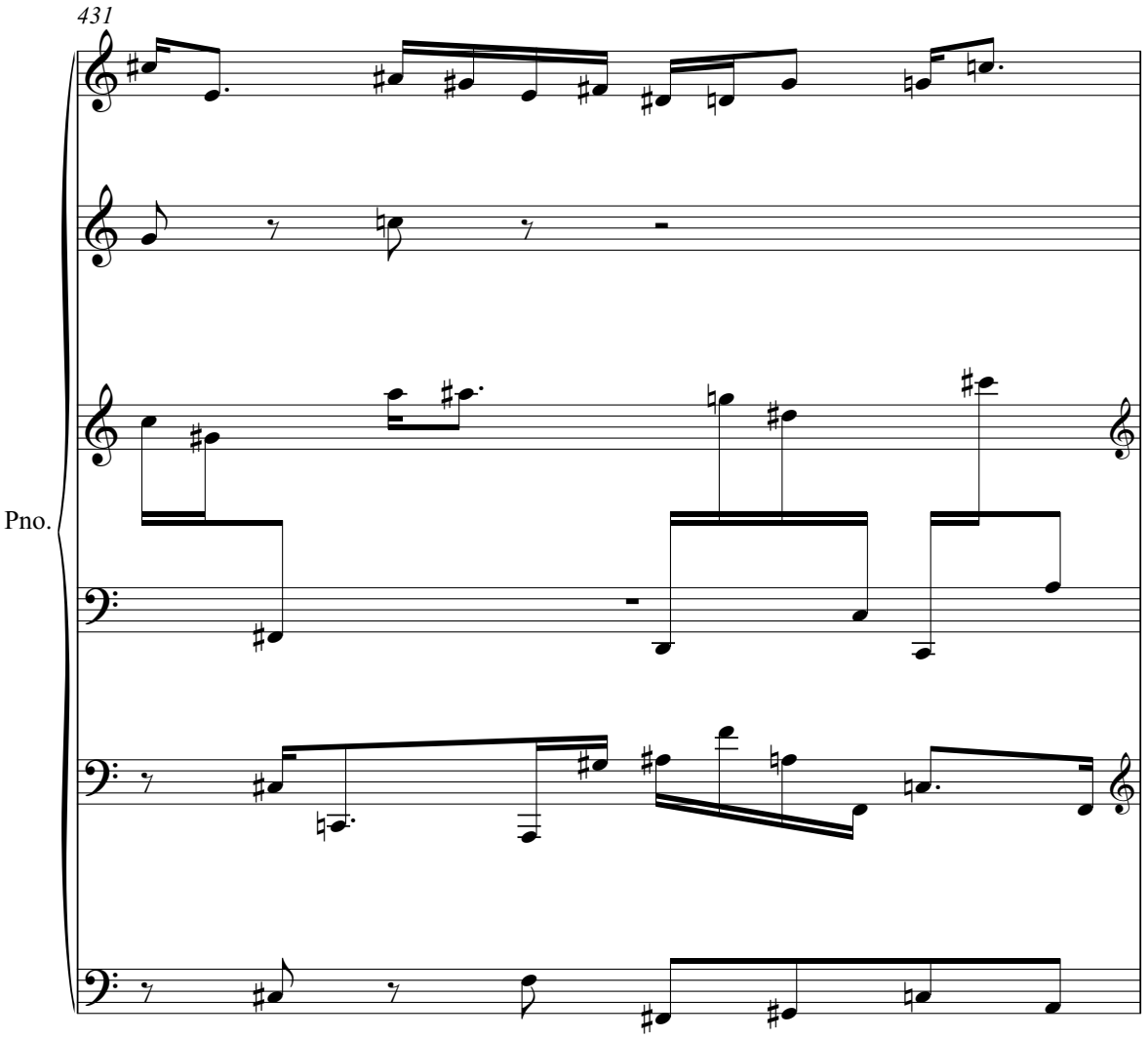

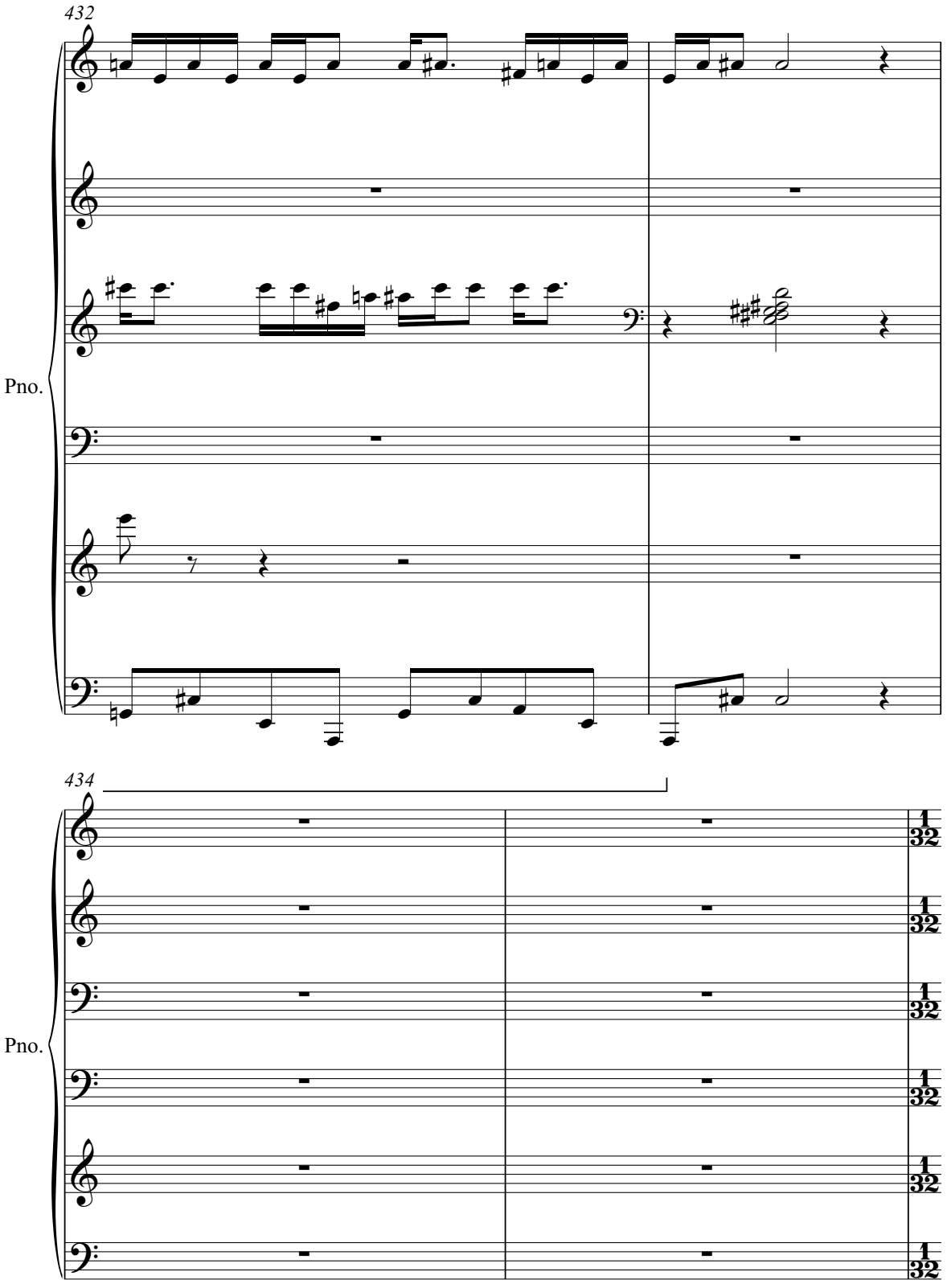
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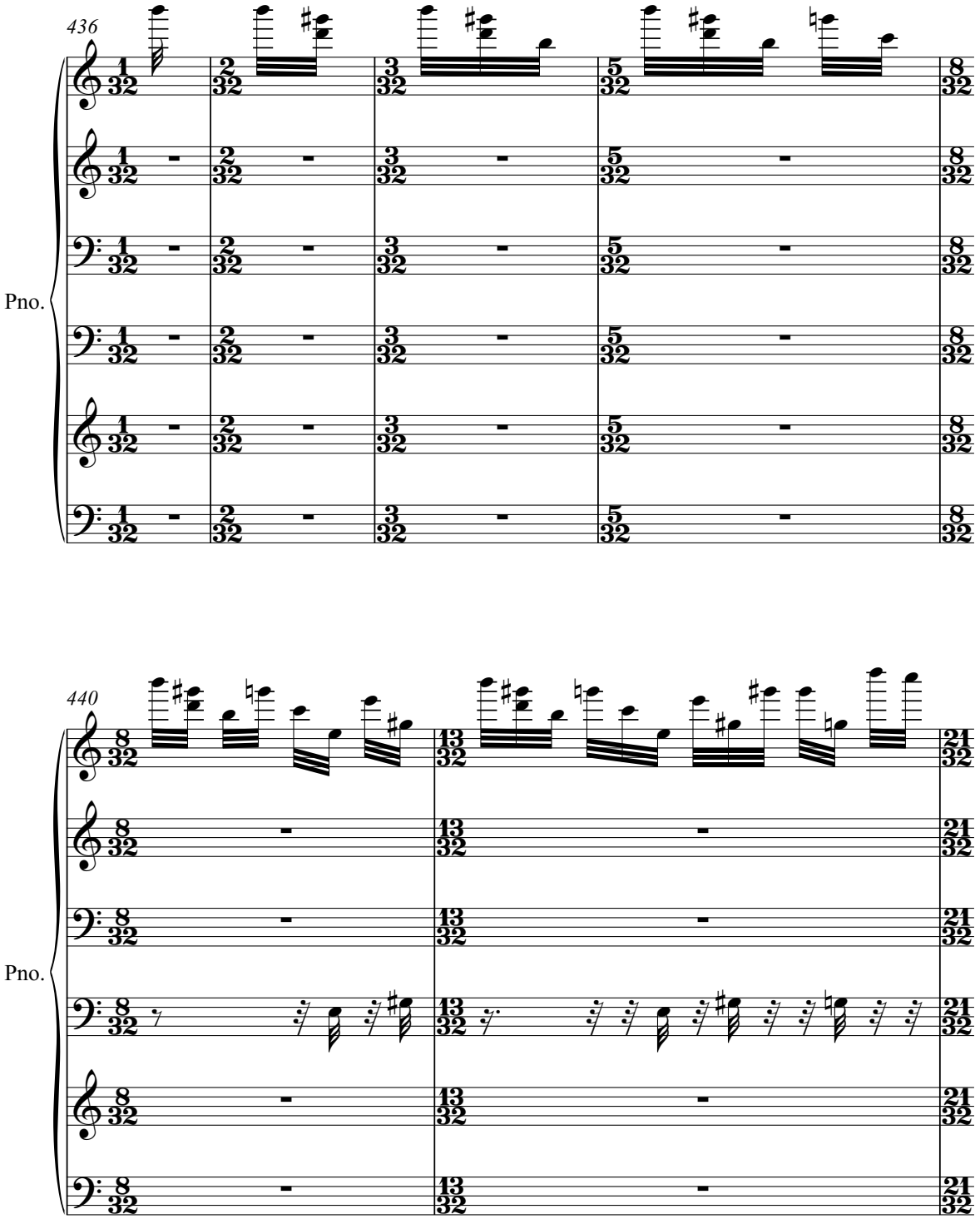

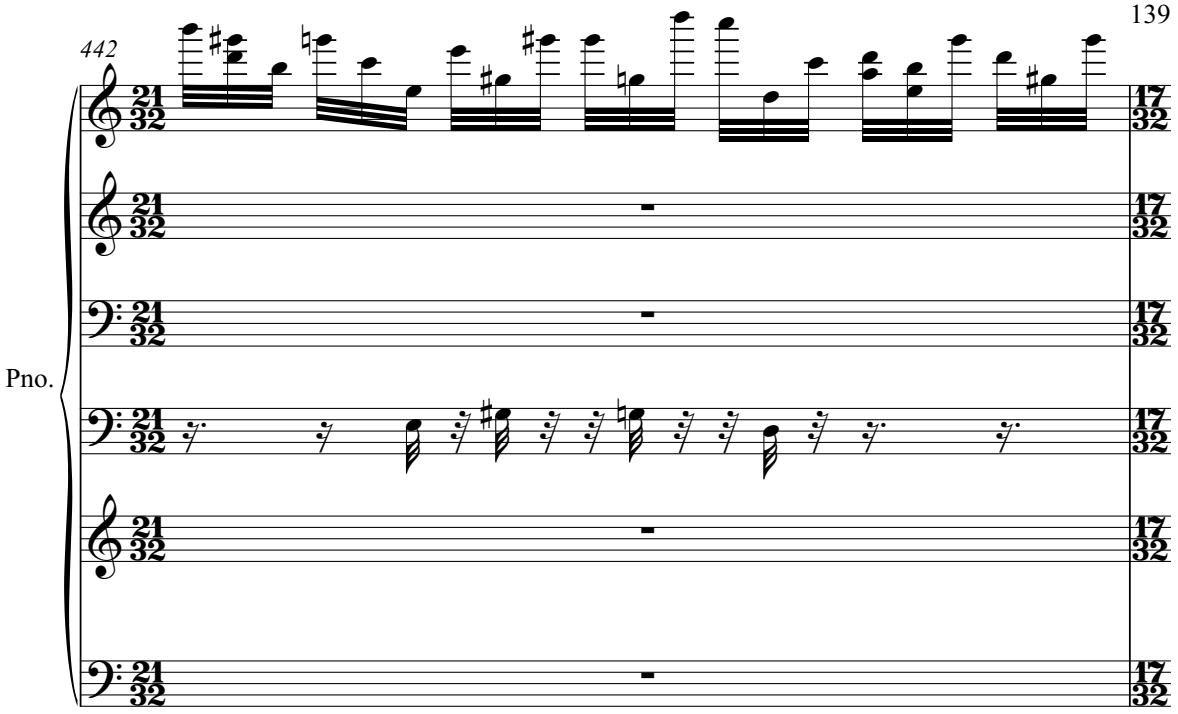
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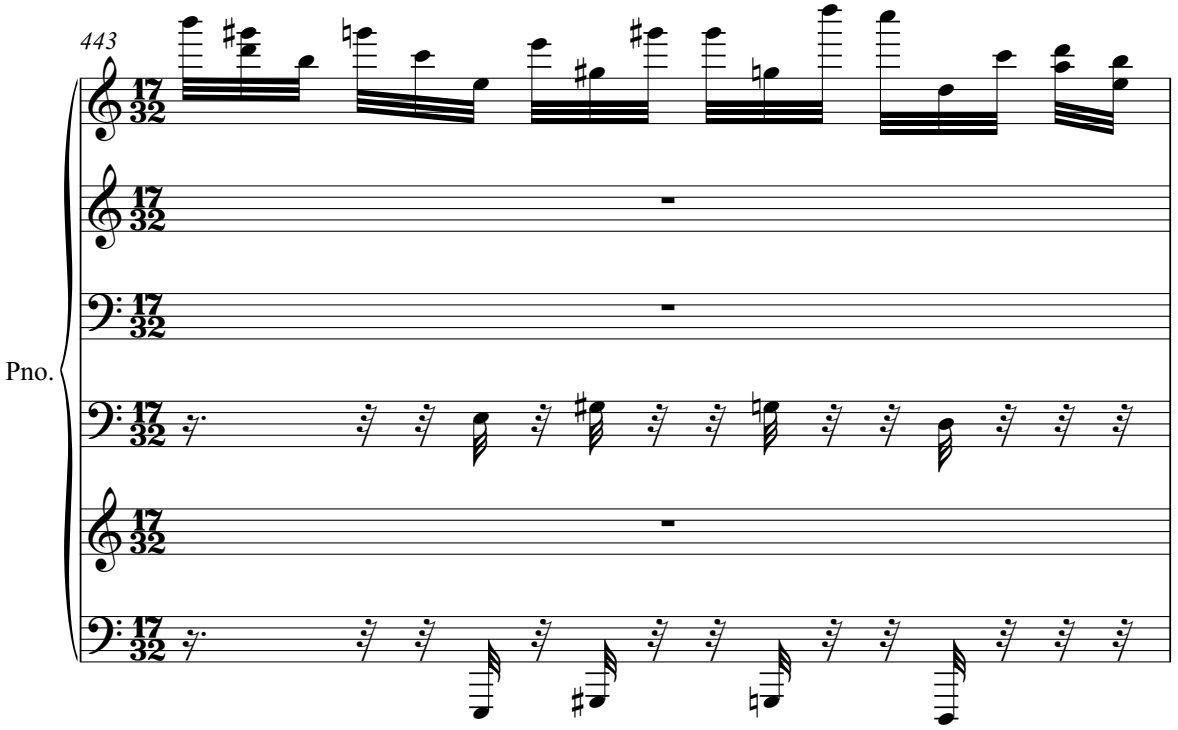
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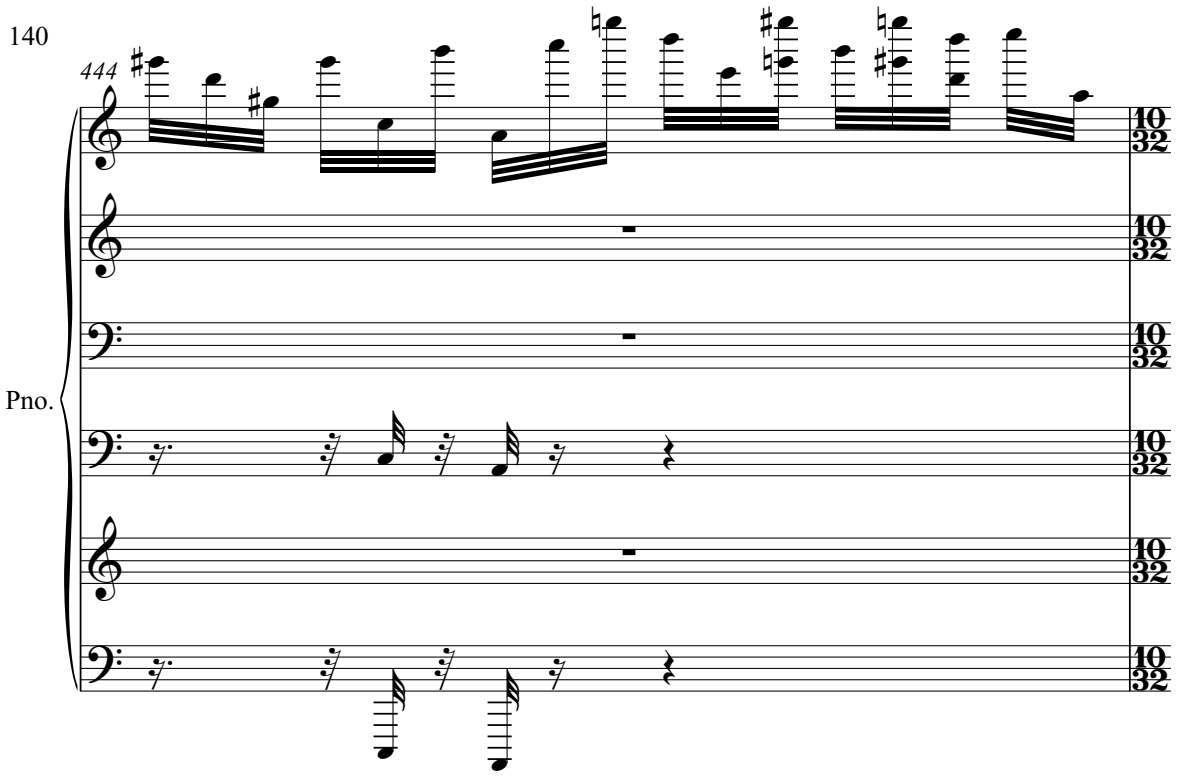
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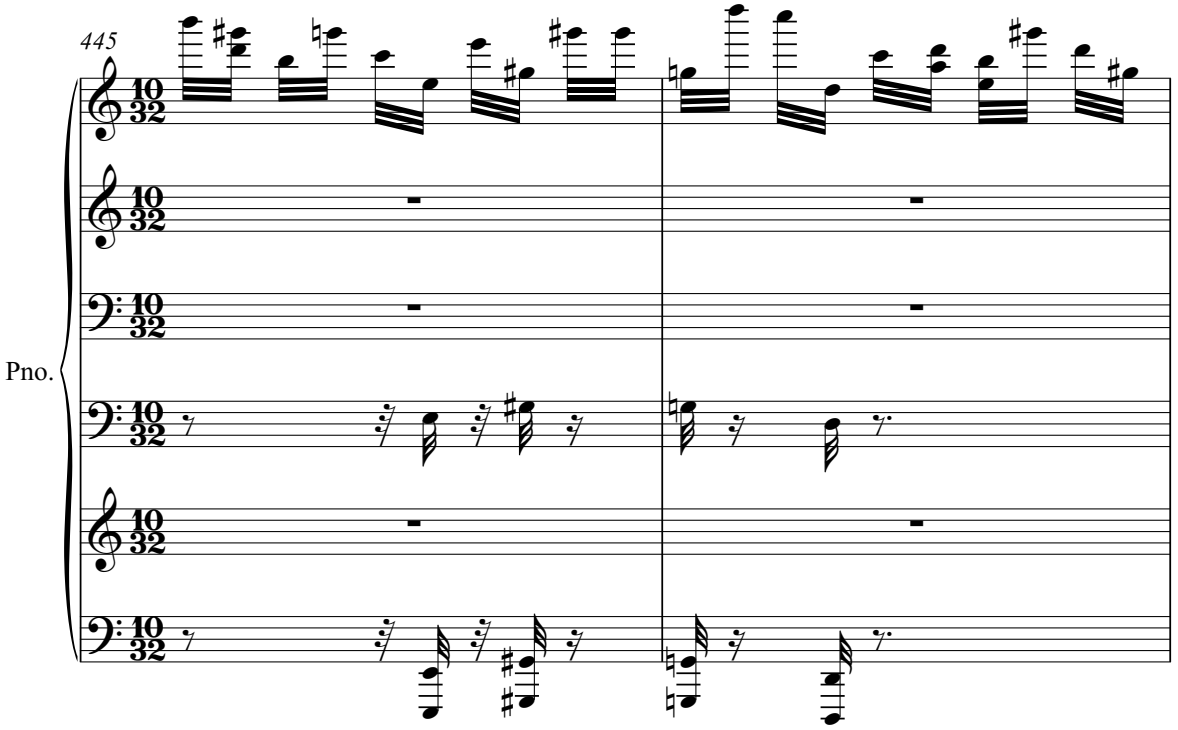
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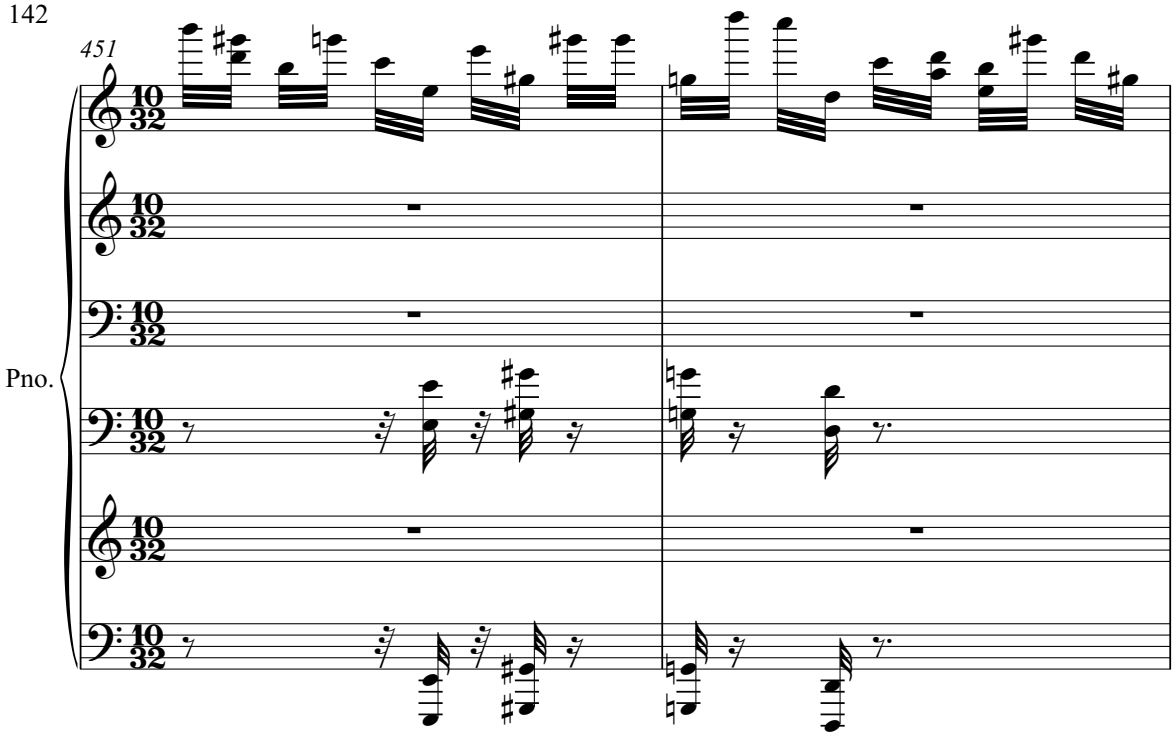

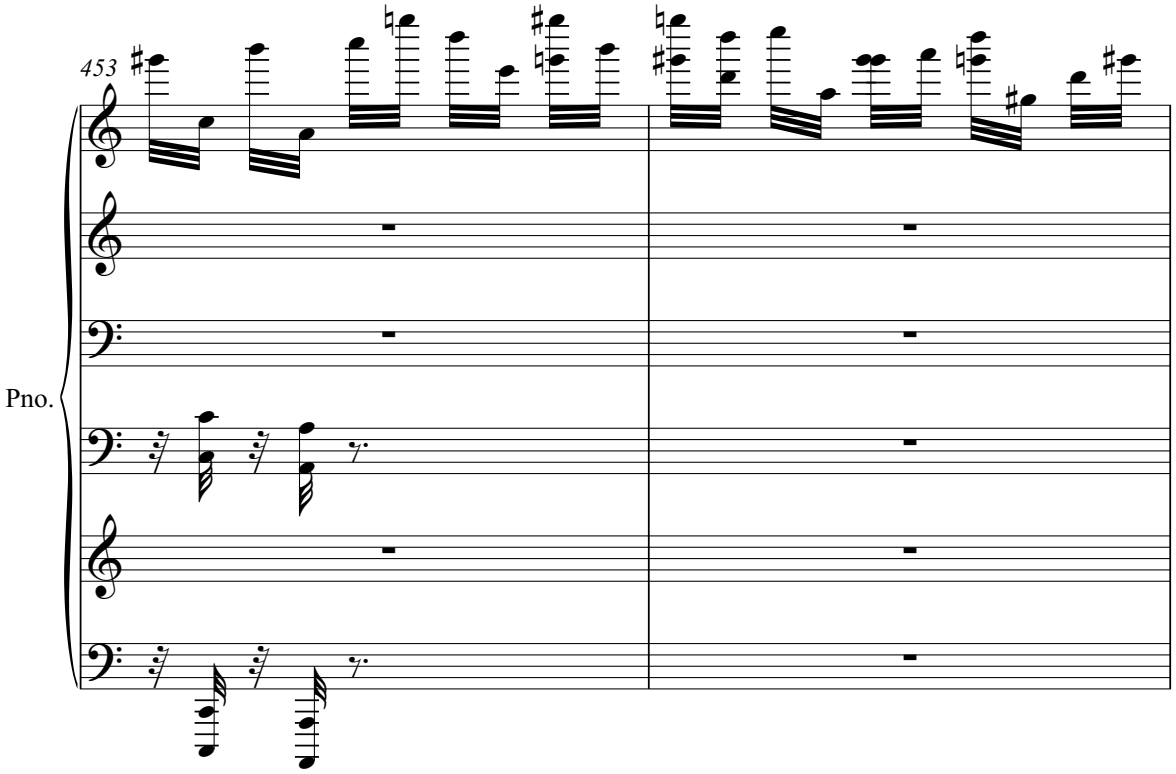

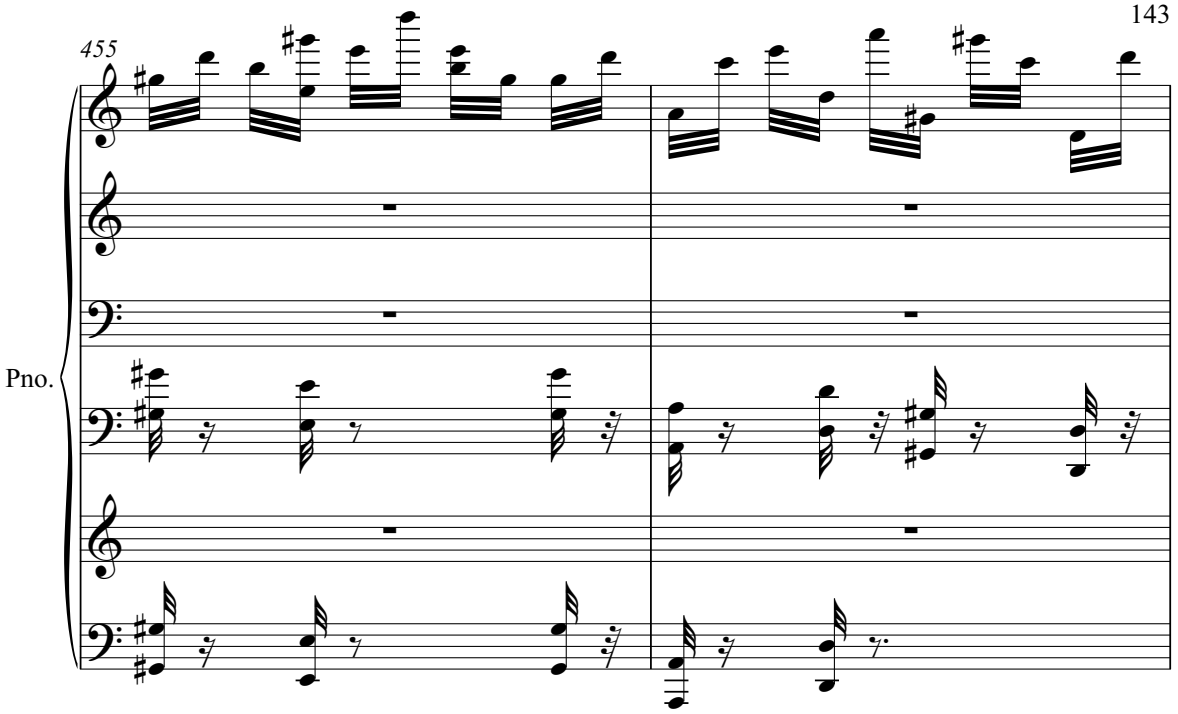
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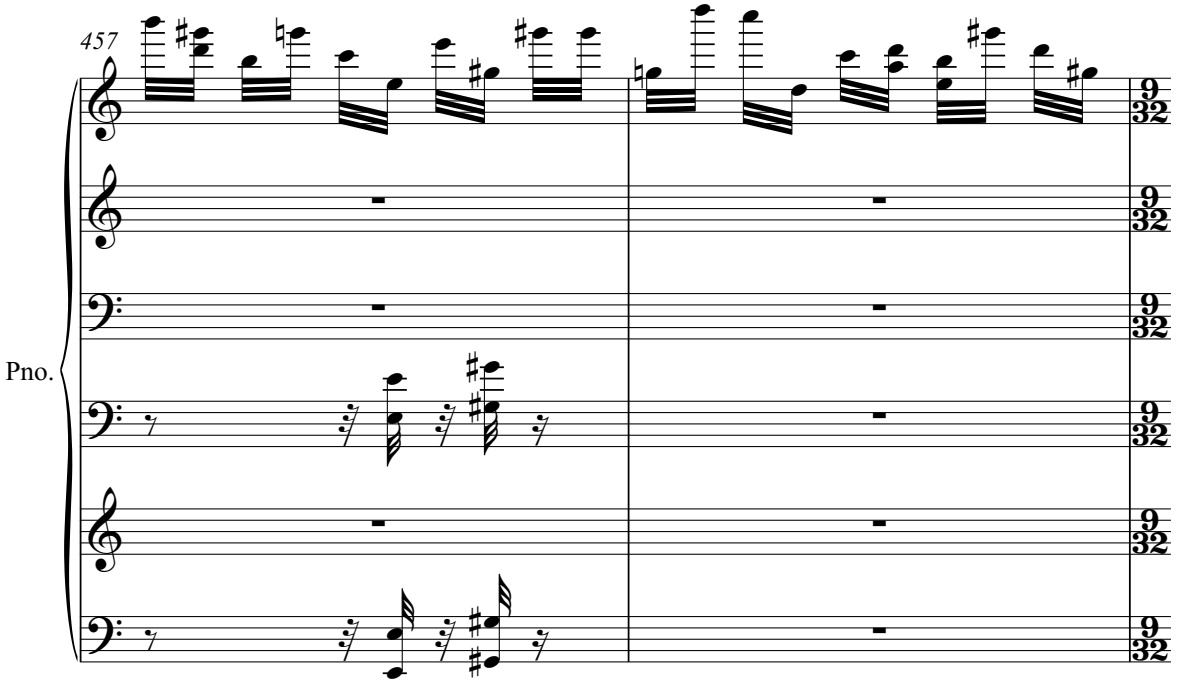
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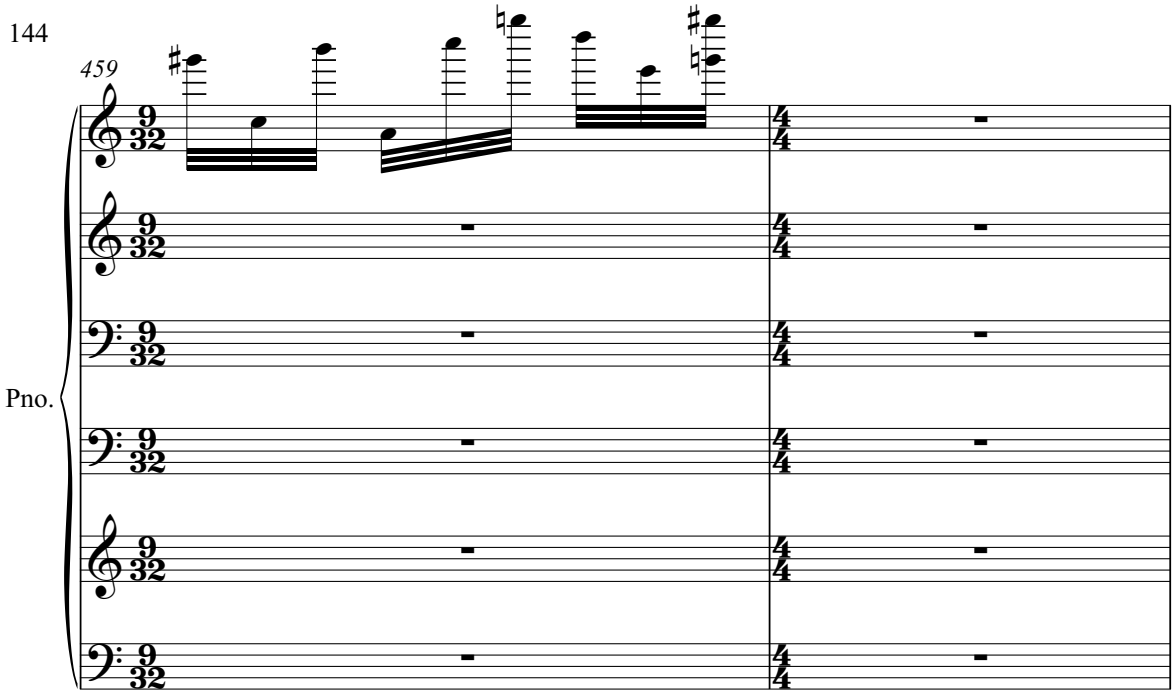

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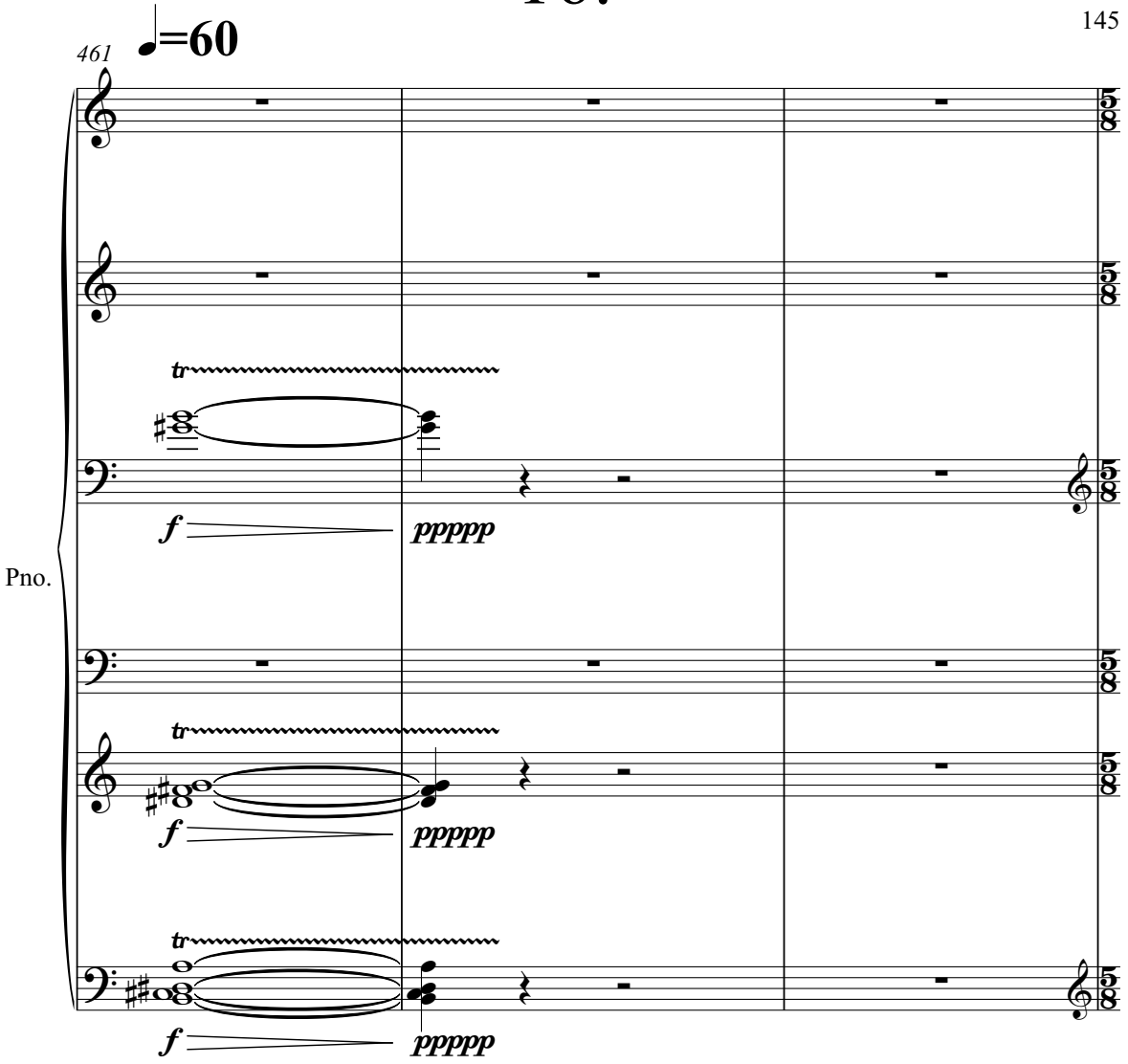

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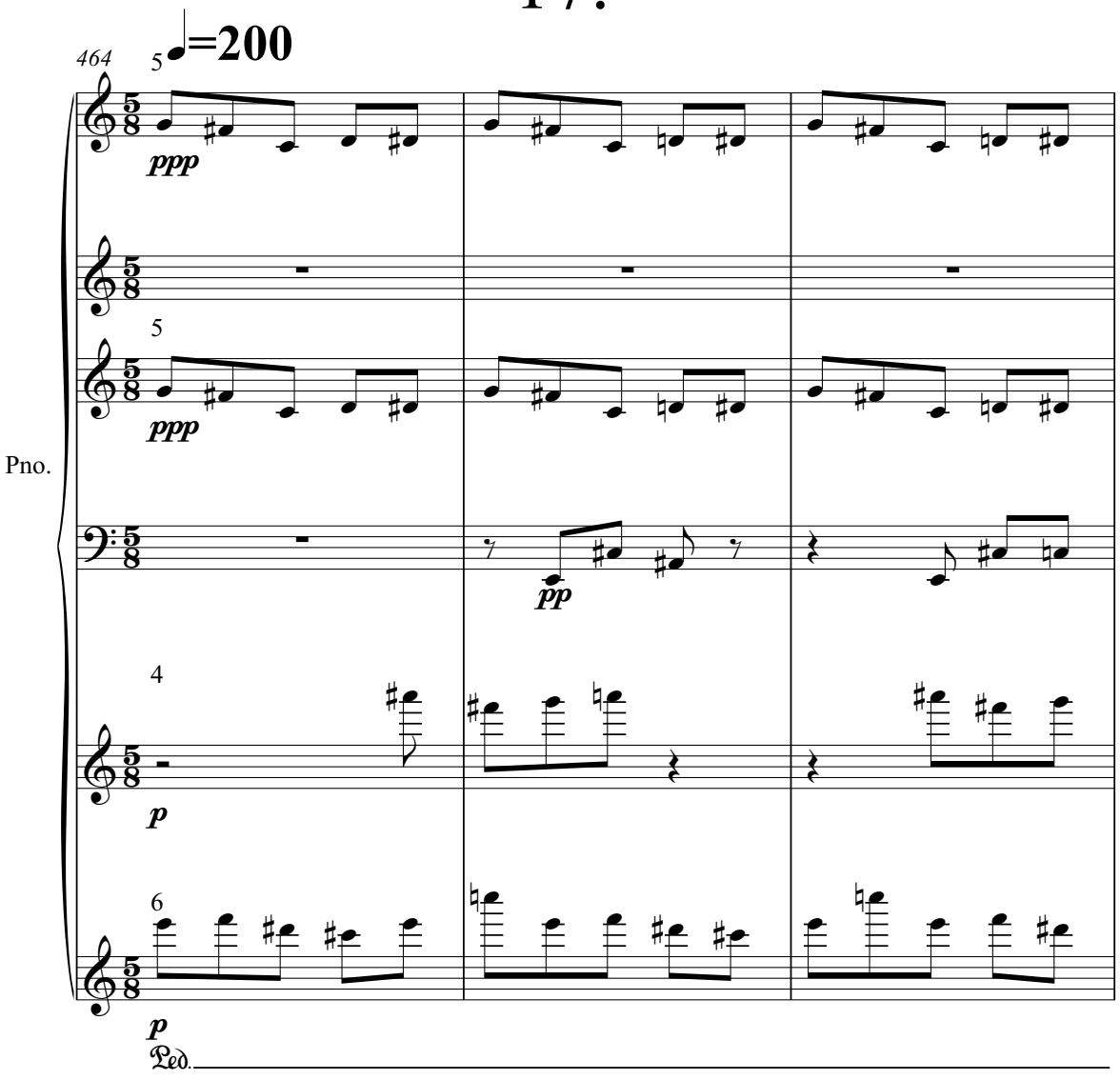

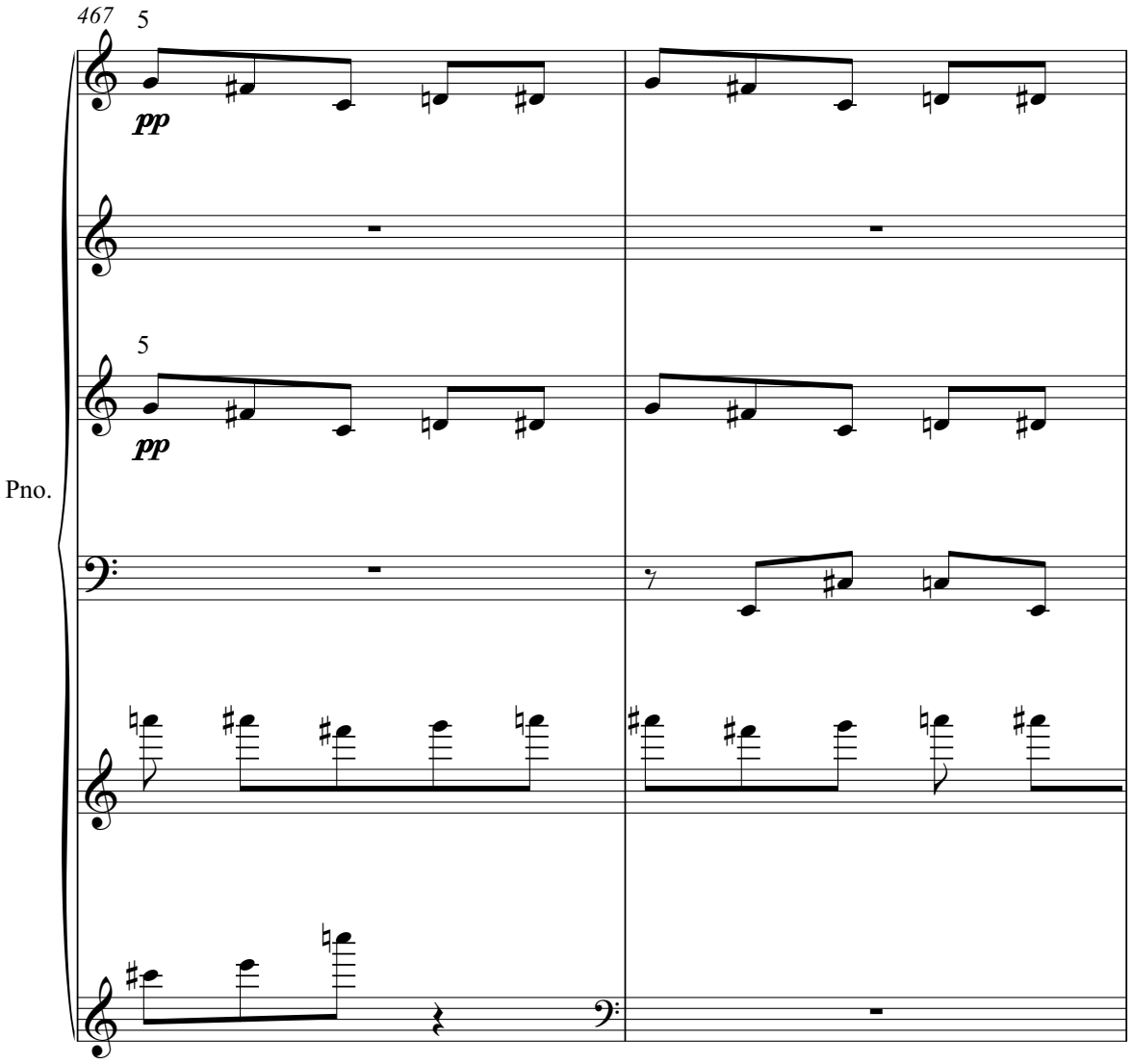
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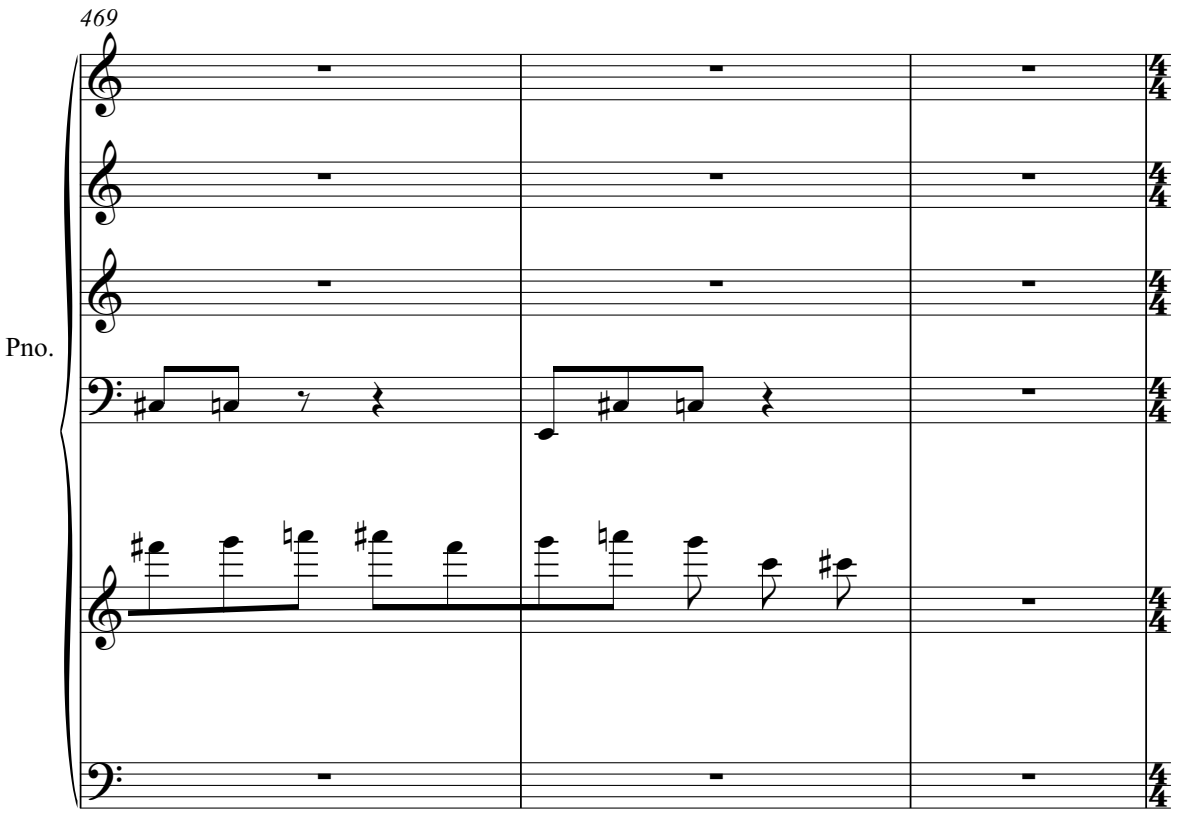

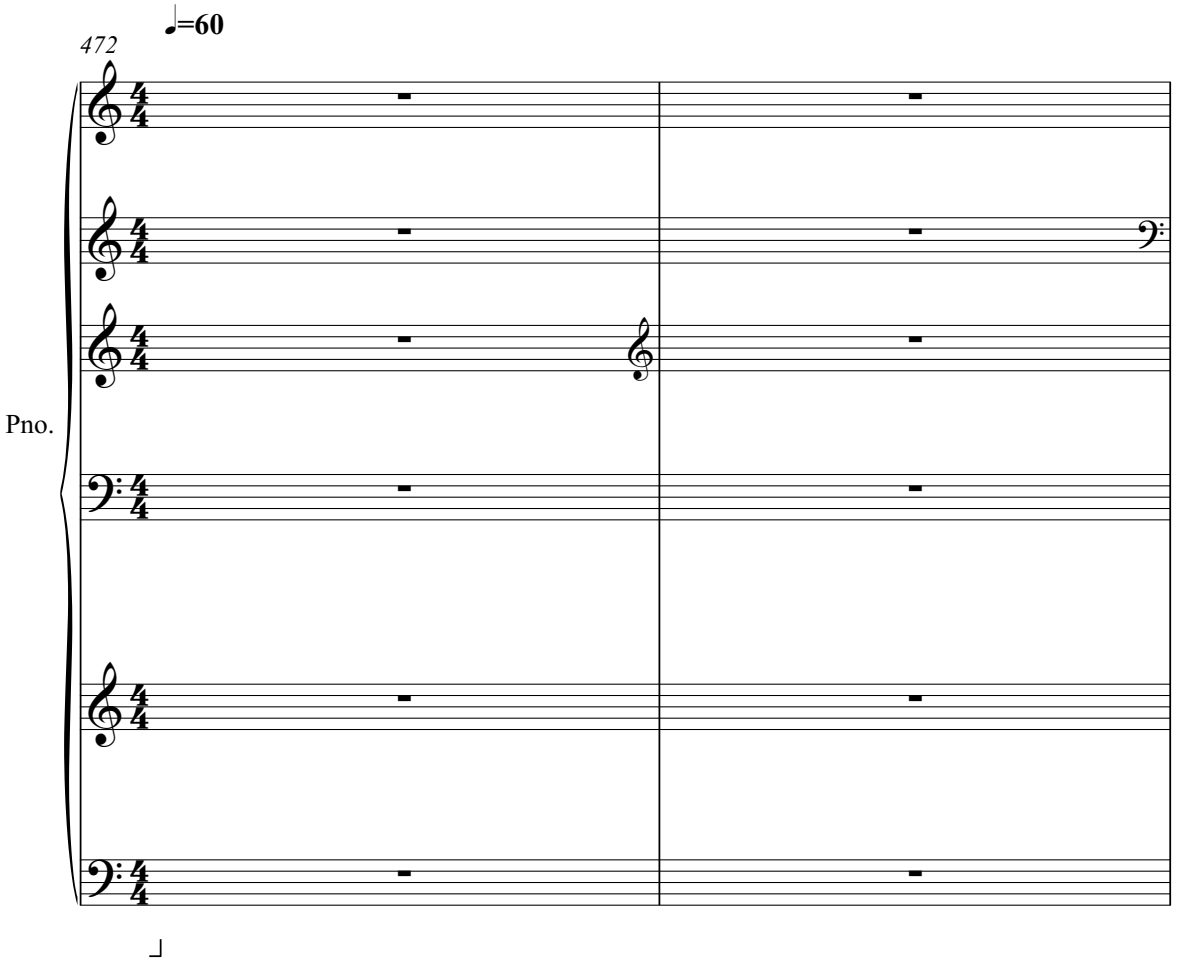
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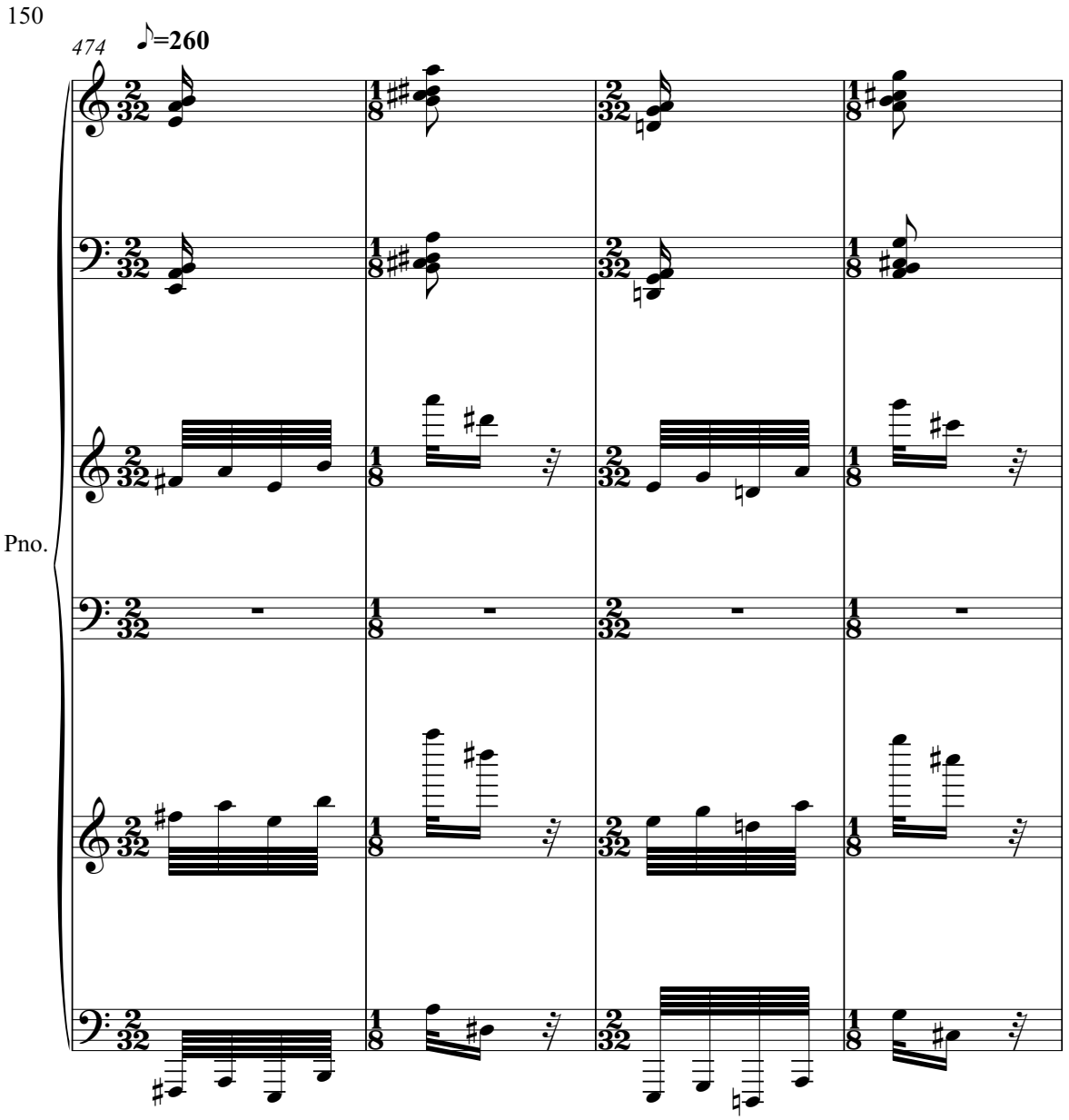

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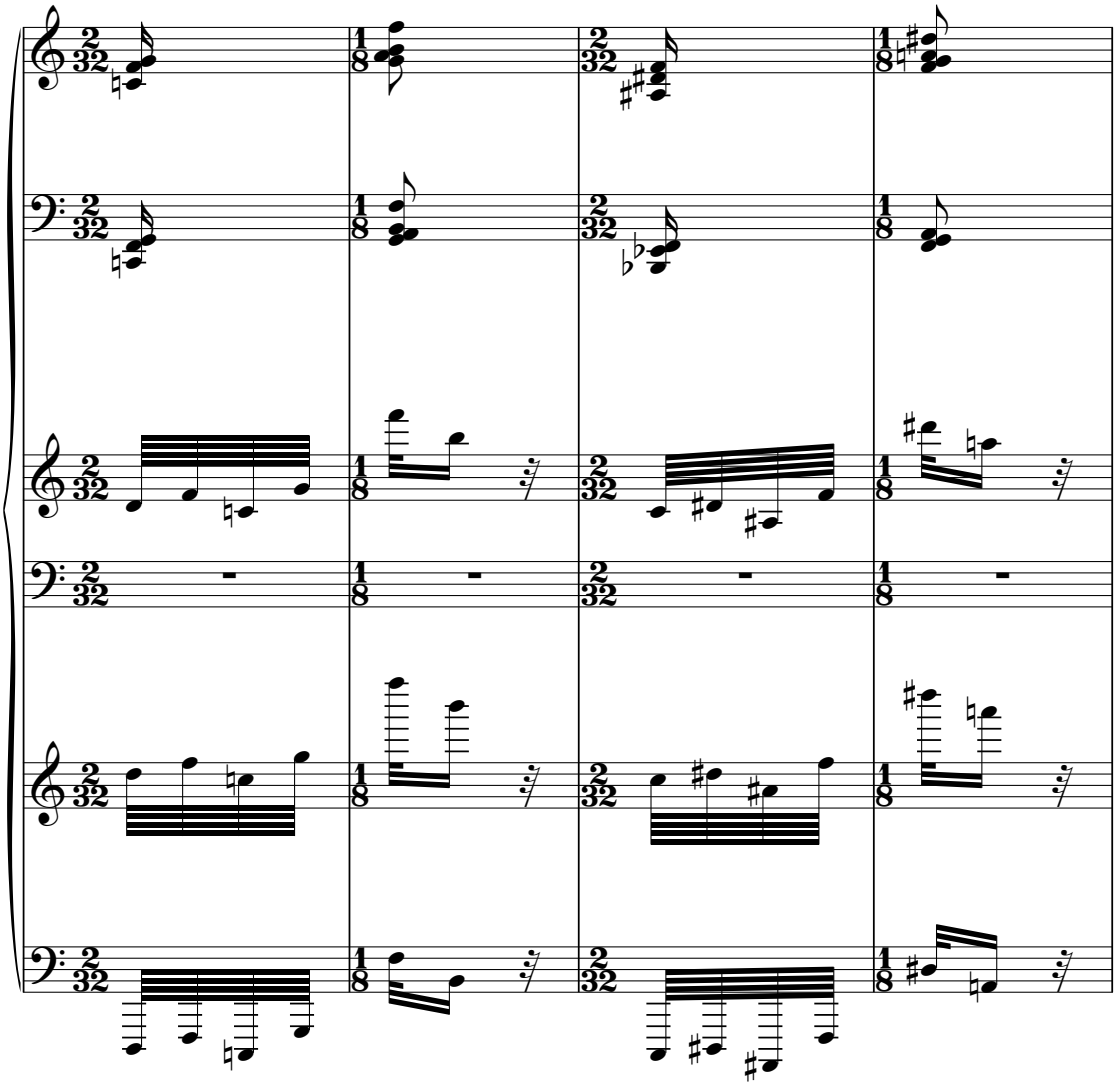

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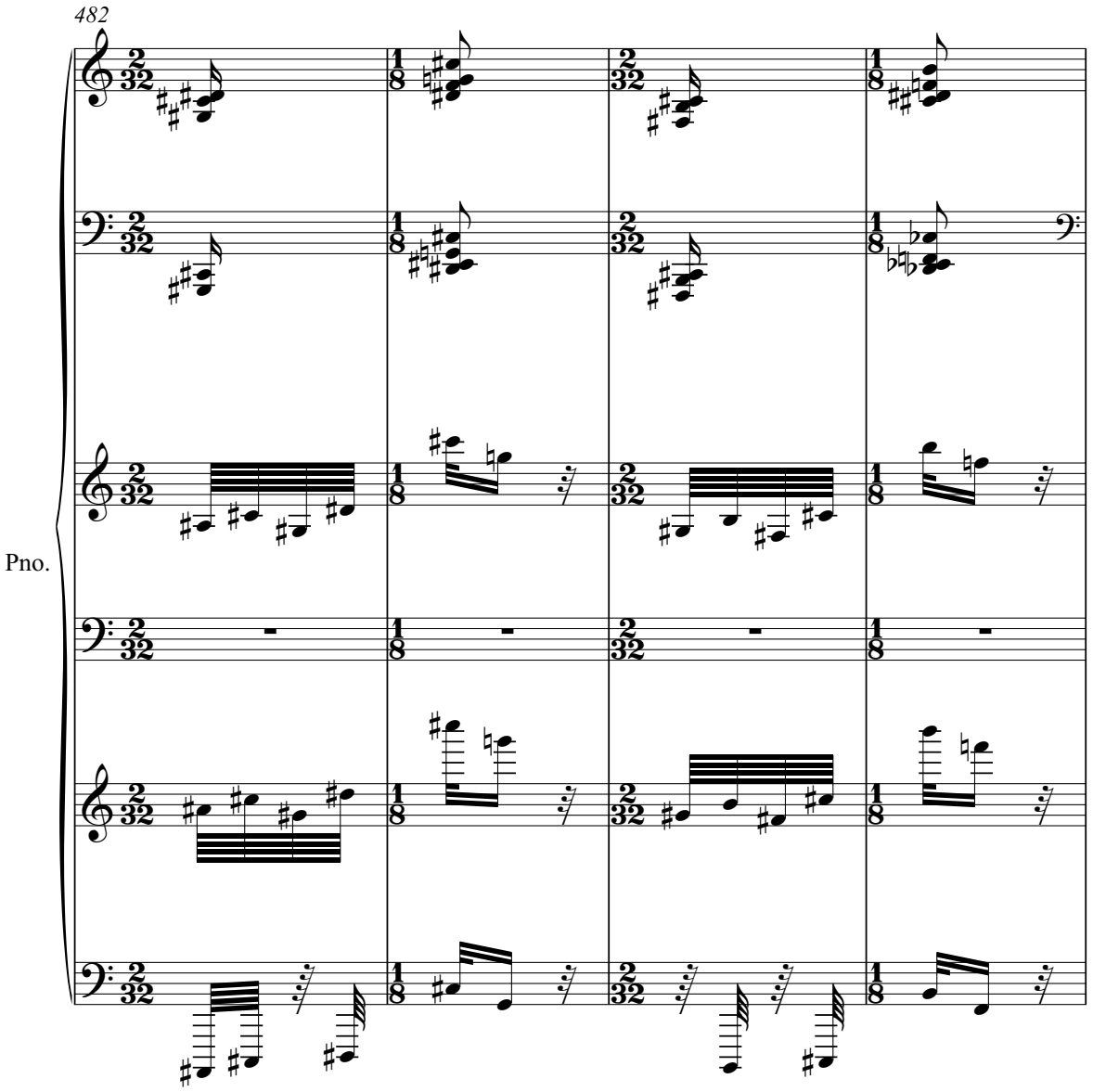
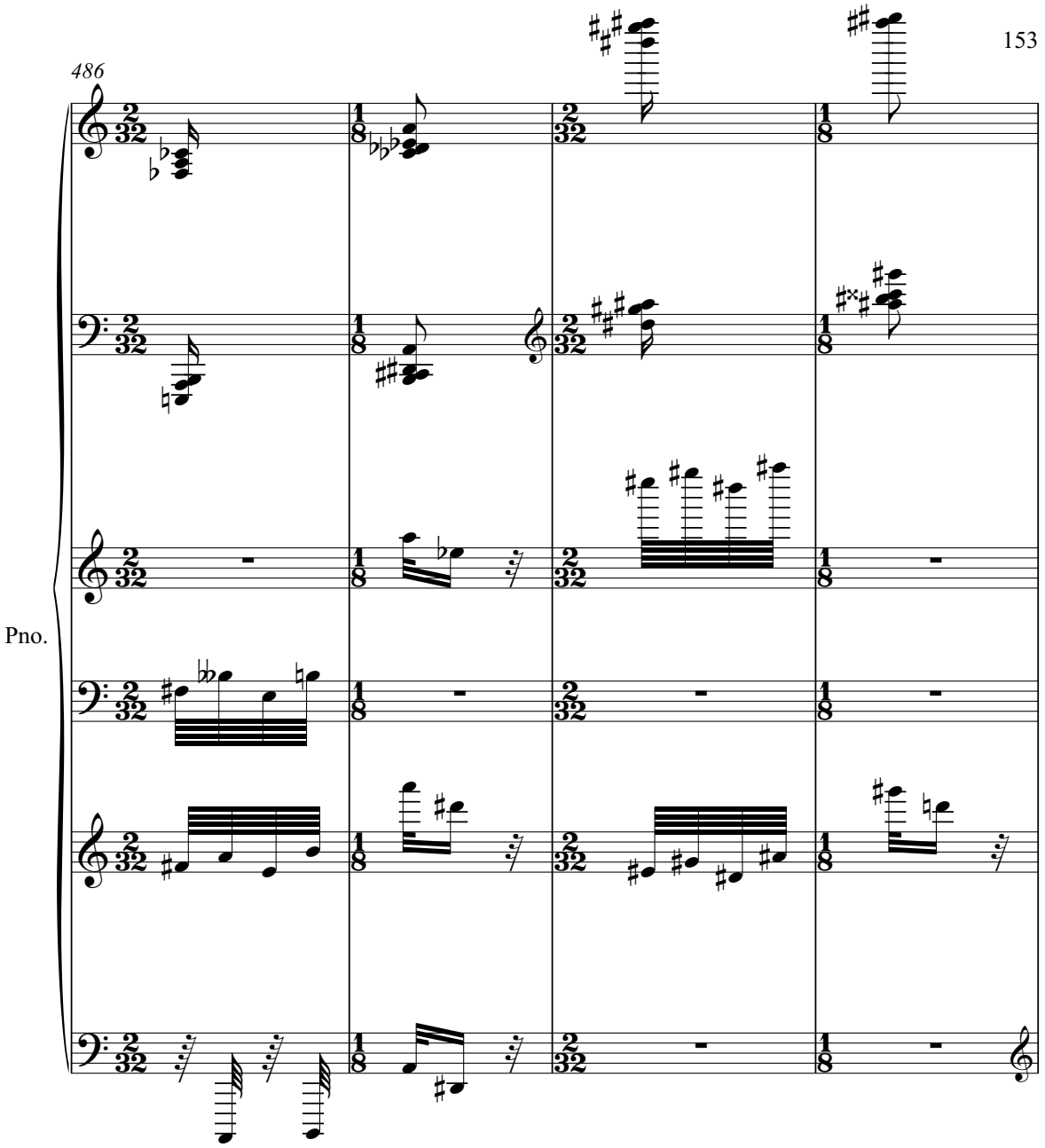
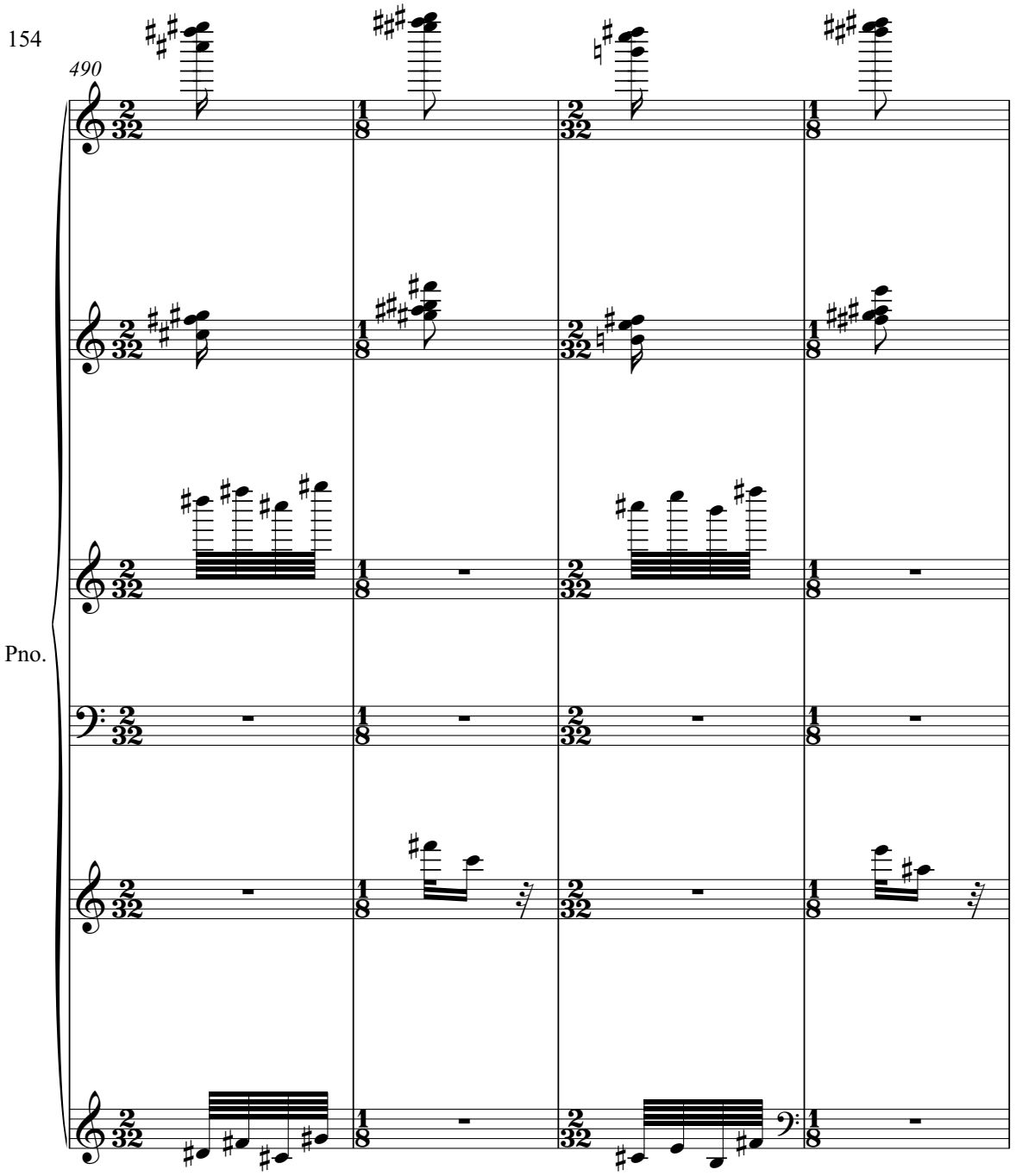
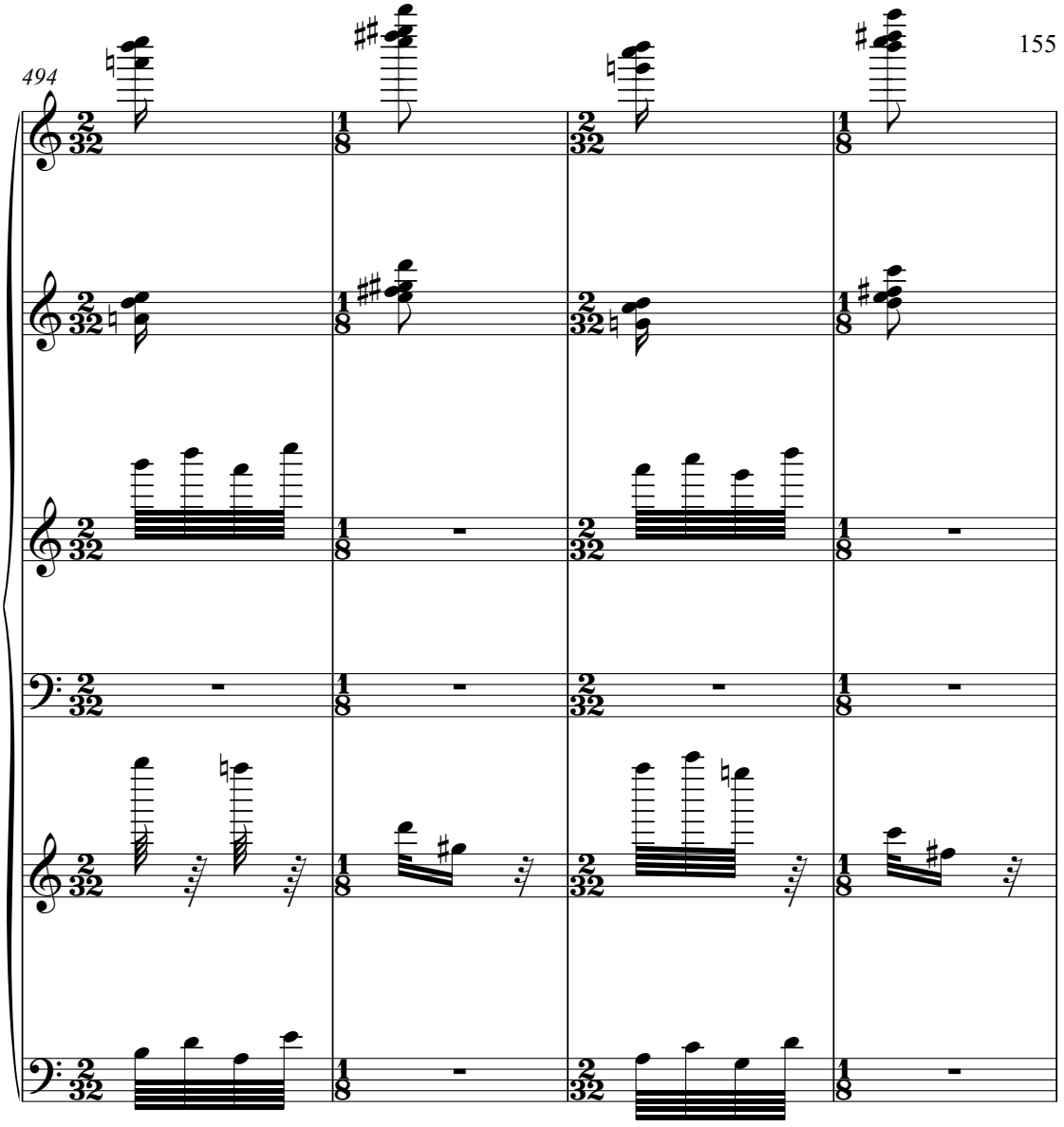



486
Pno.

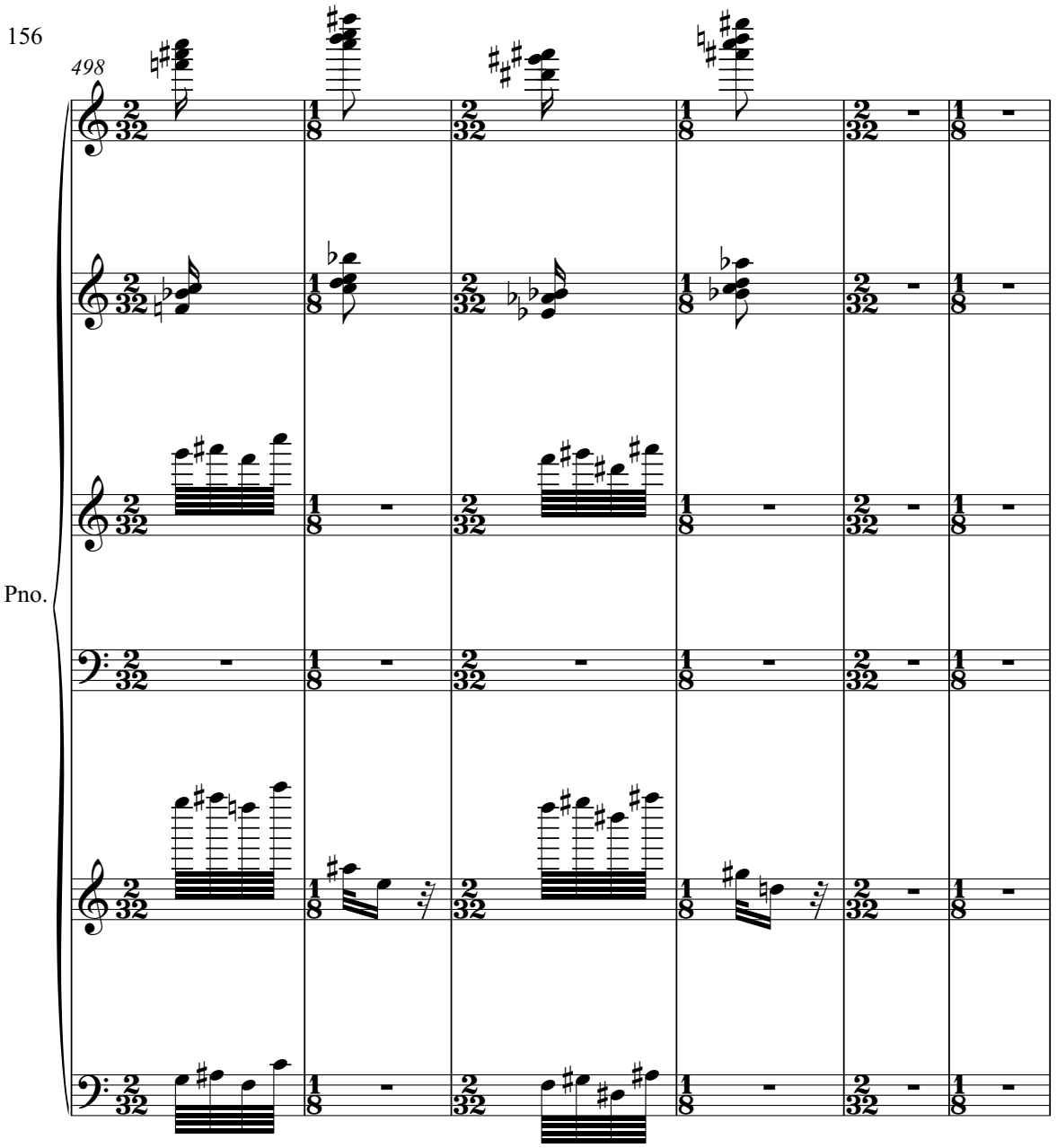

154
490
Pno.

494

Pno.



156



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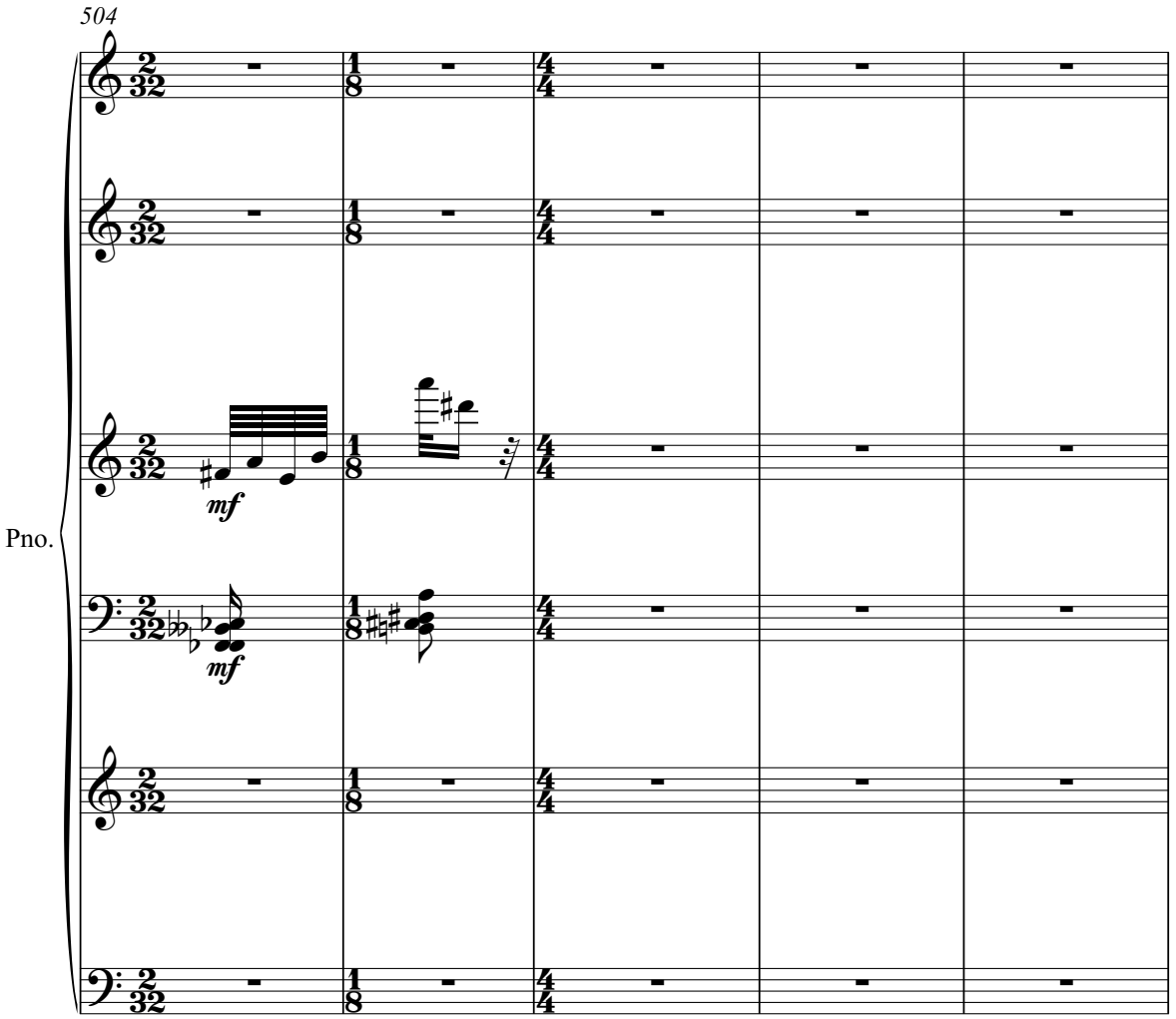
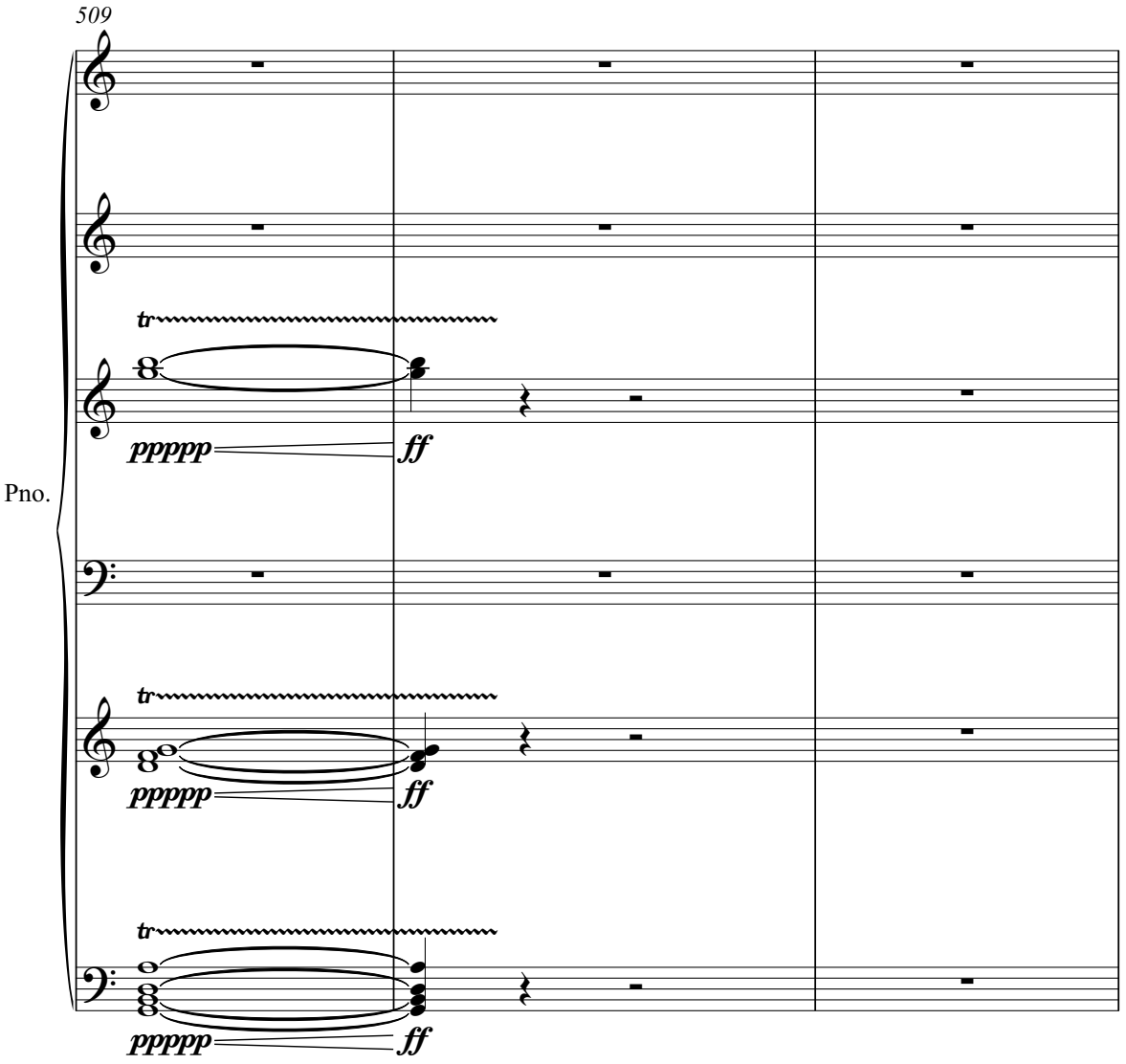


20.

158

♩=60



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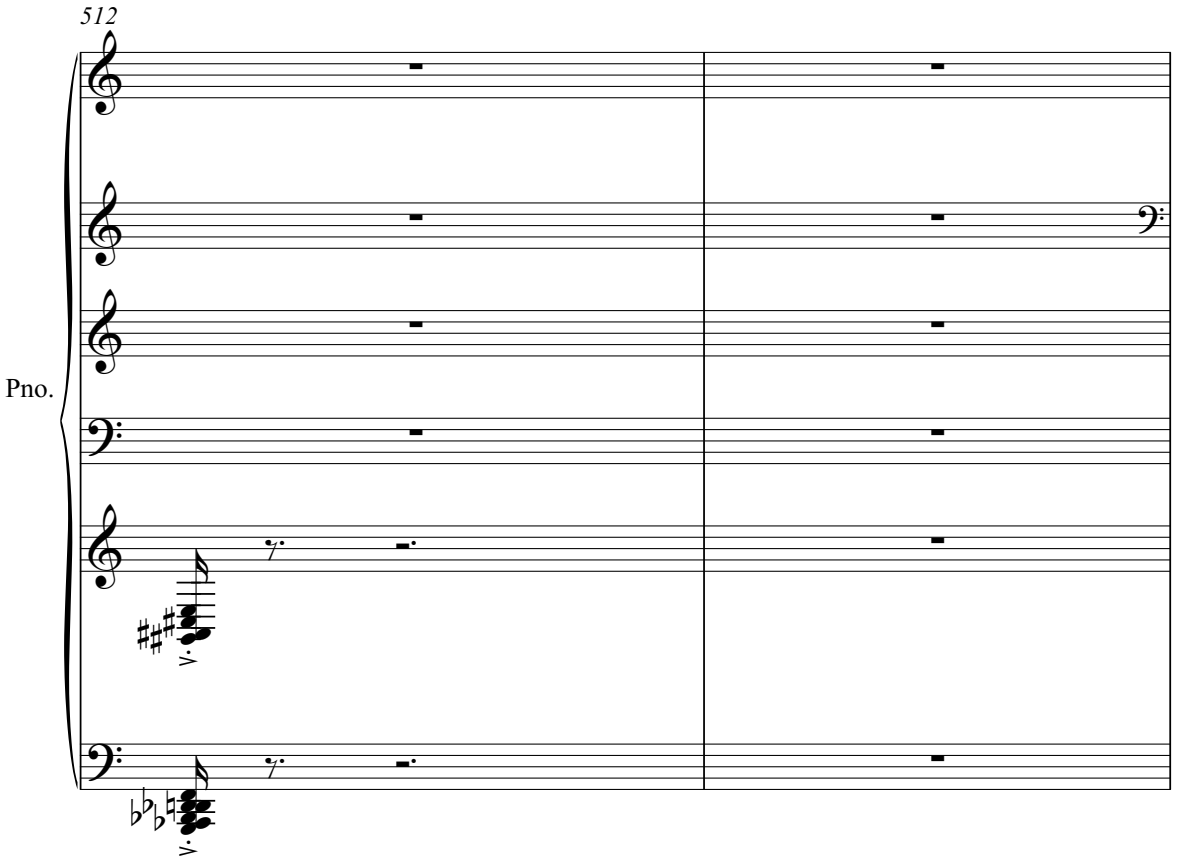

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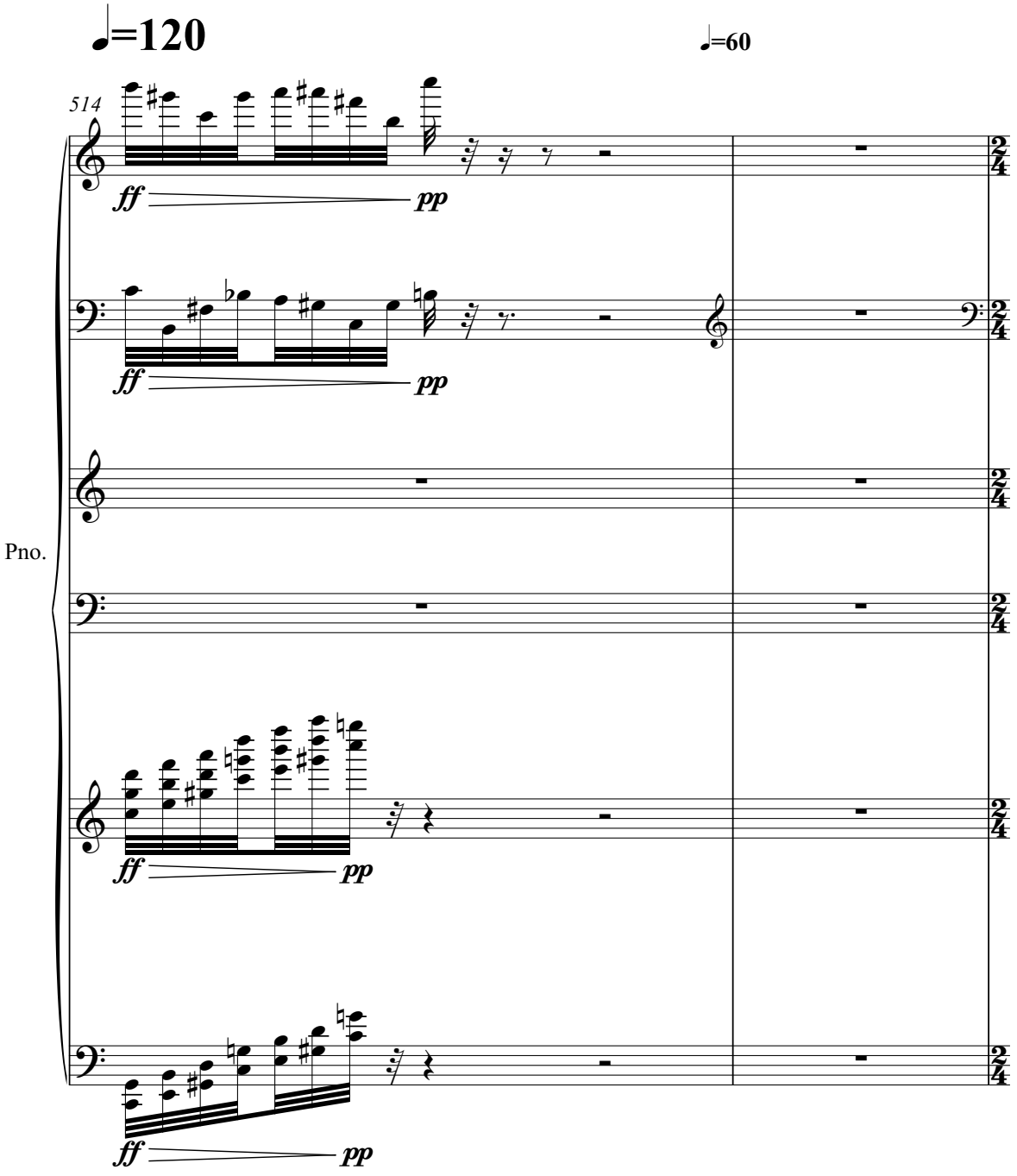
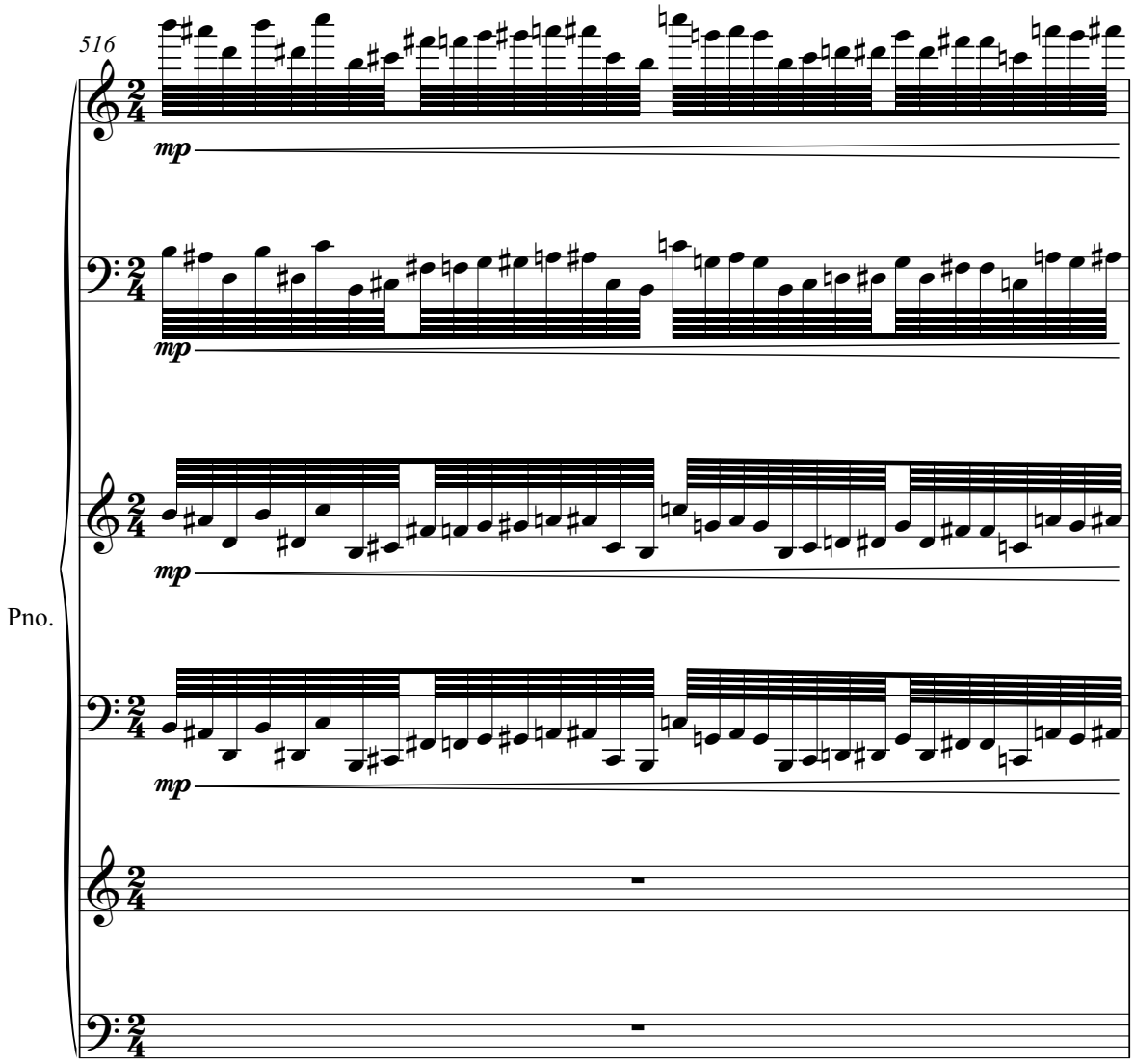


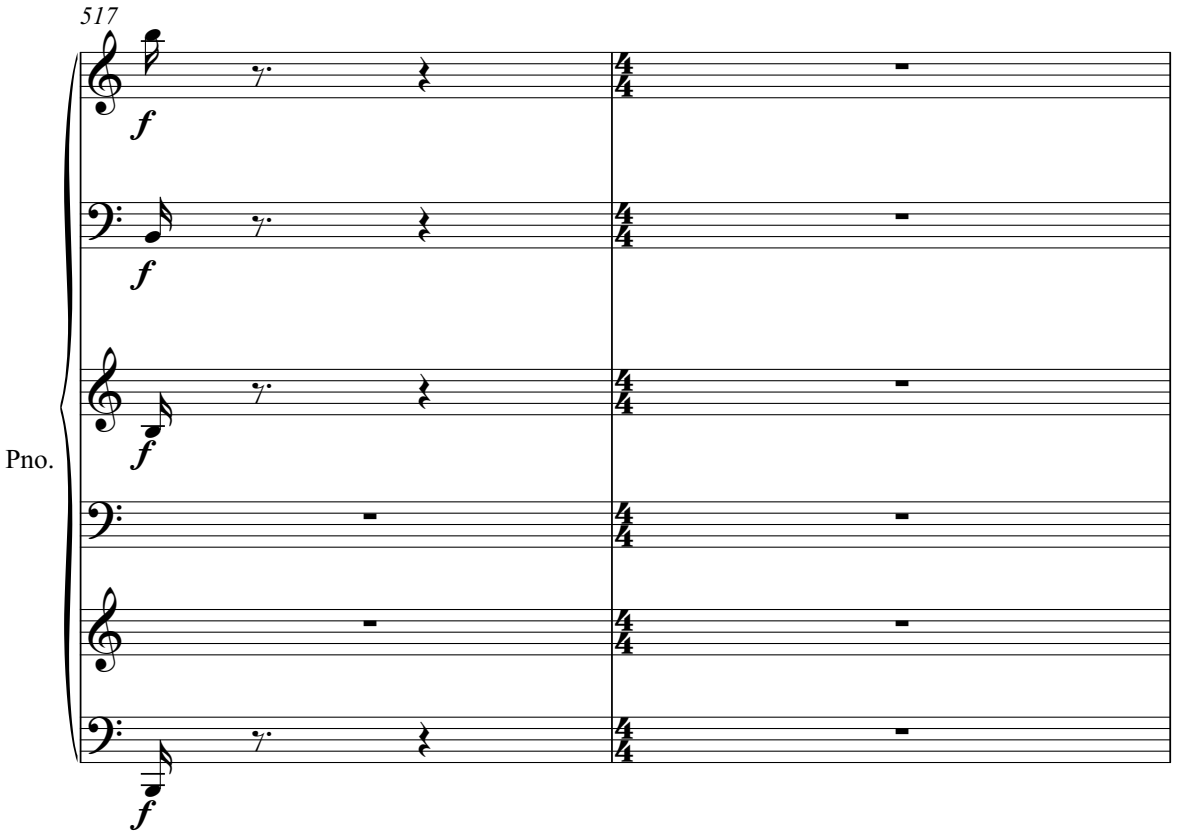
23.

♩=130

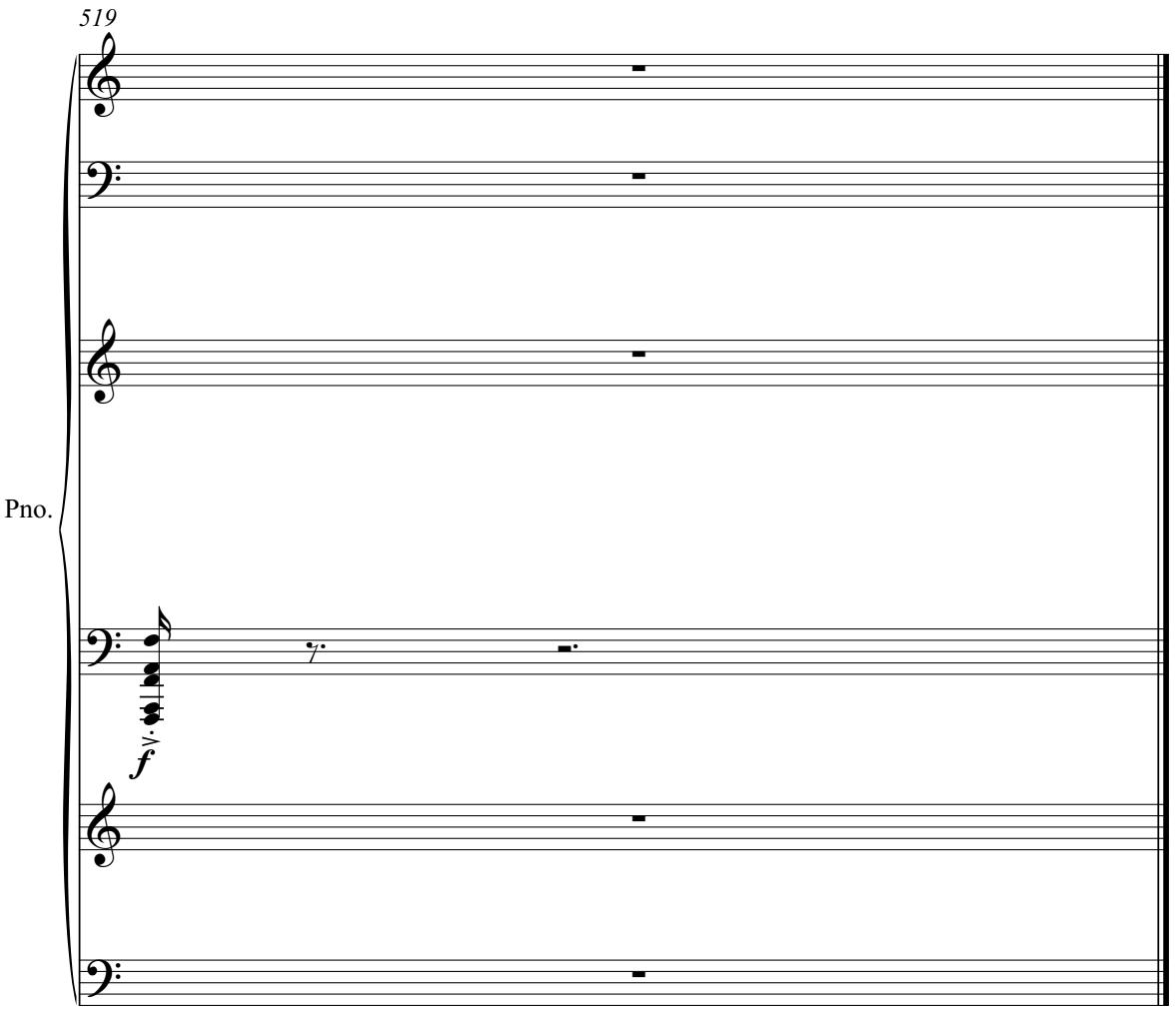
516



162



24.



C.2

Marco at the Record Store (2014-2017)

For Vibraphone, Flute, Tenor Saxophone, Cello and Fixed Media

Ori Barel

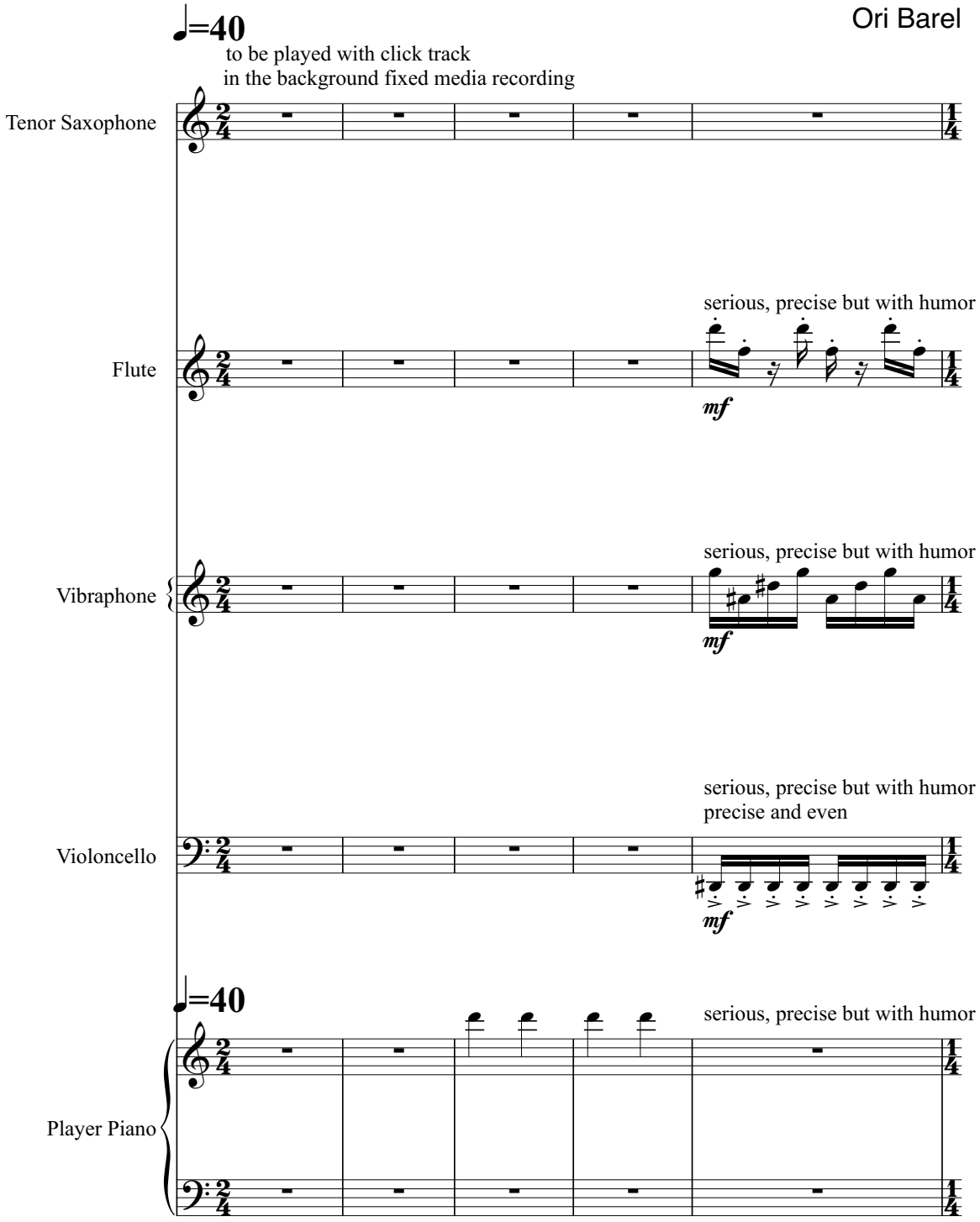
Marco at the Record Store

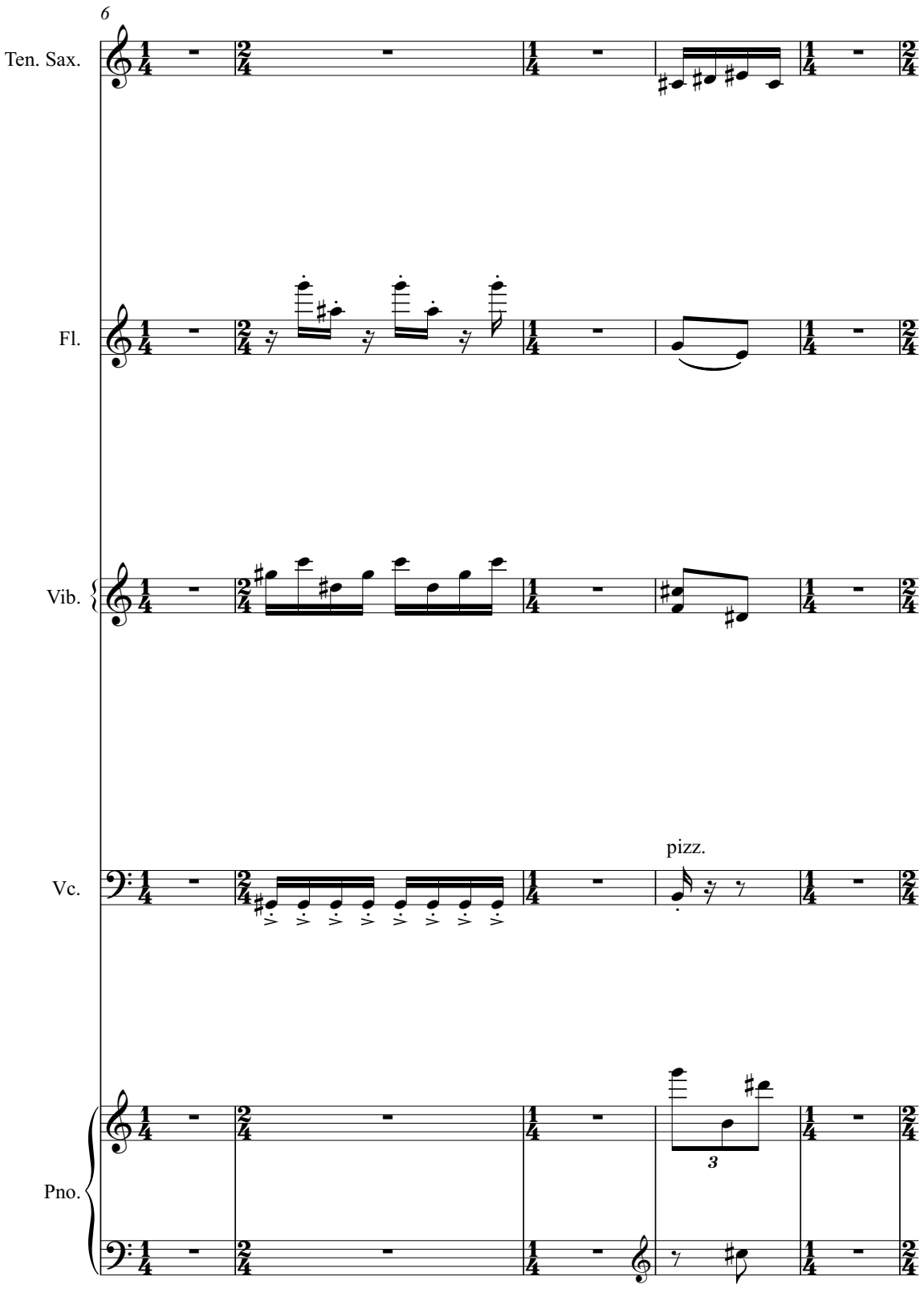
For Player Piano, Flute, Vibraphone,
Cello, Tenor Saxophone and fixed media

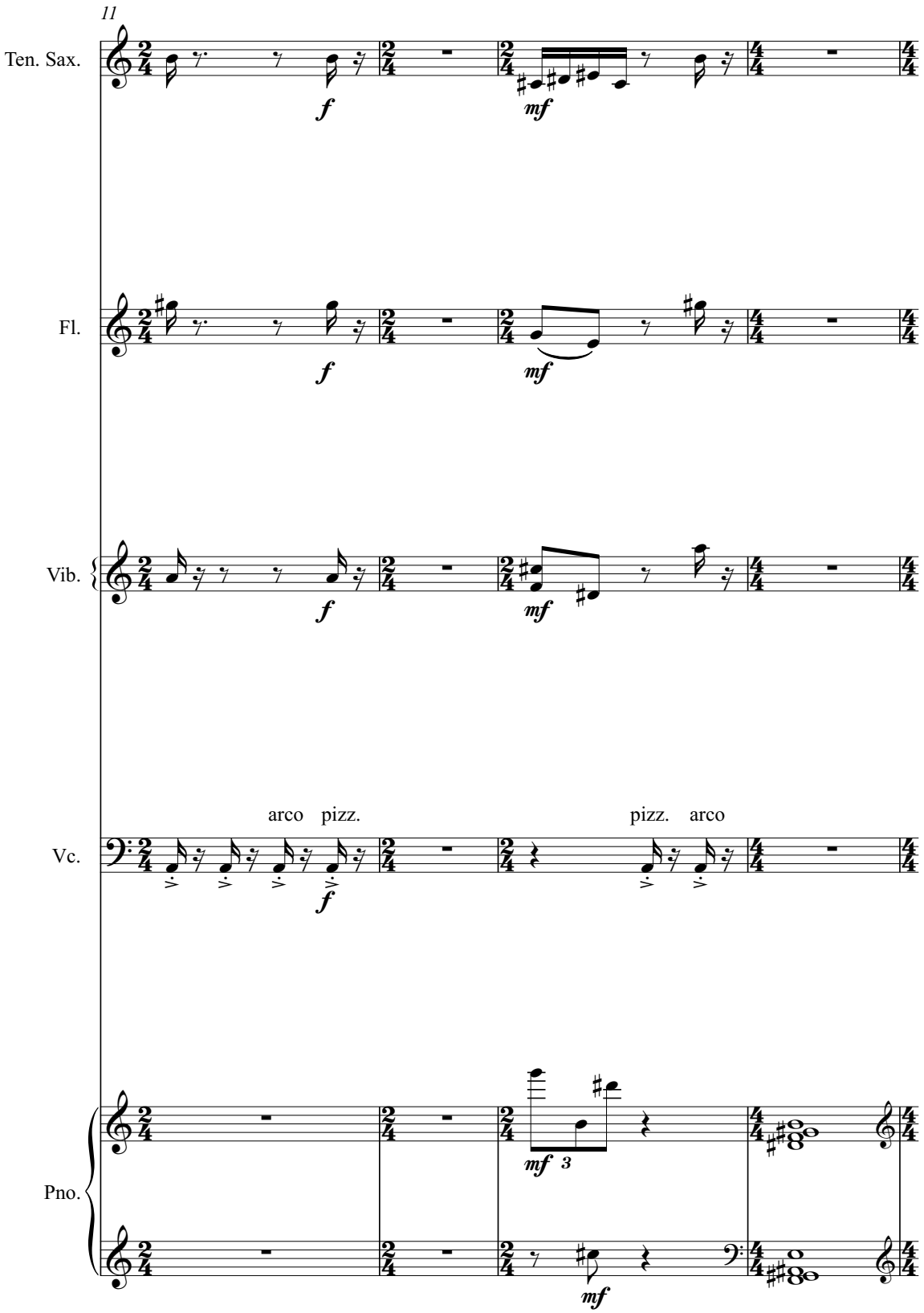
Marco in the Record Store

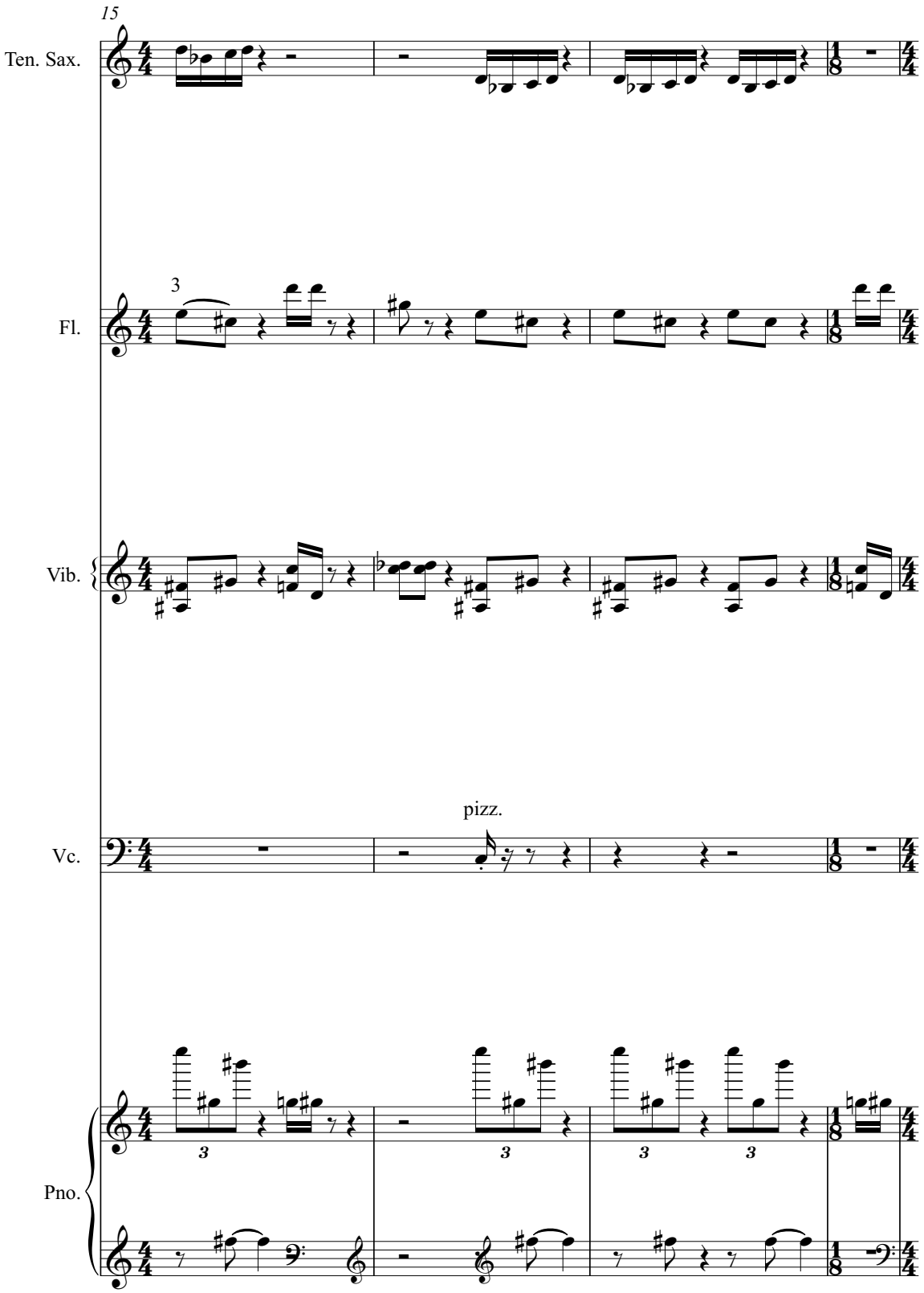
1. Marco contemplates going to the record store

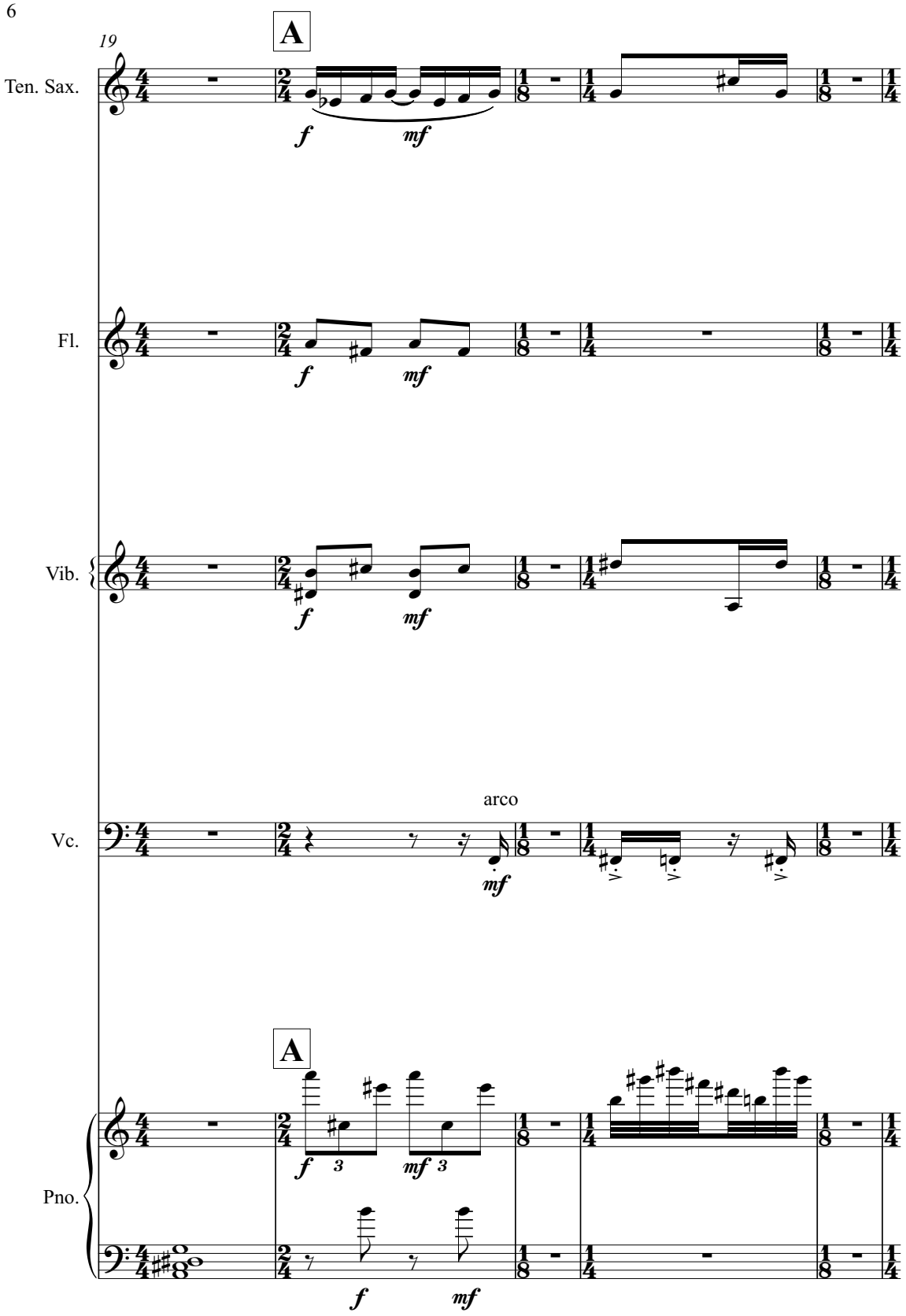
Ori Barel

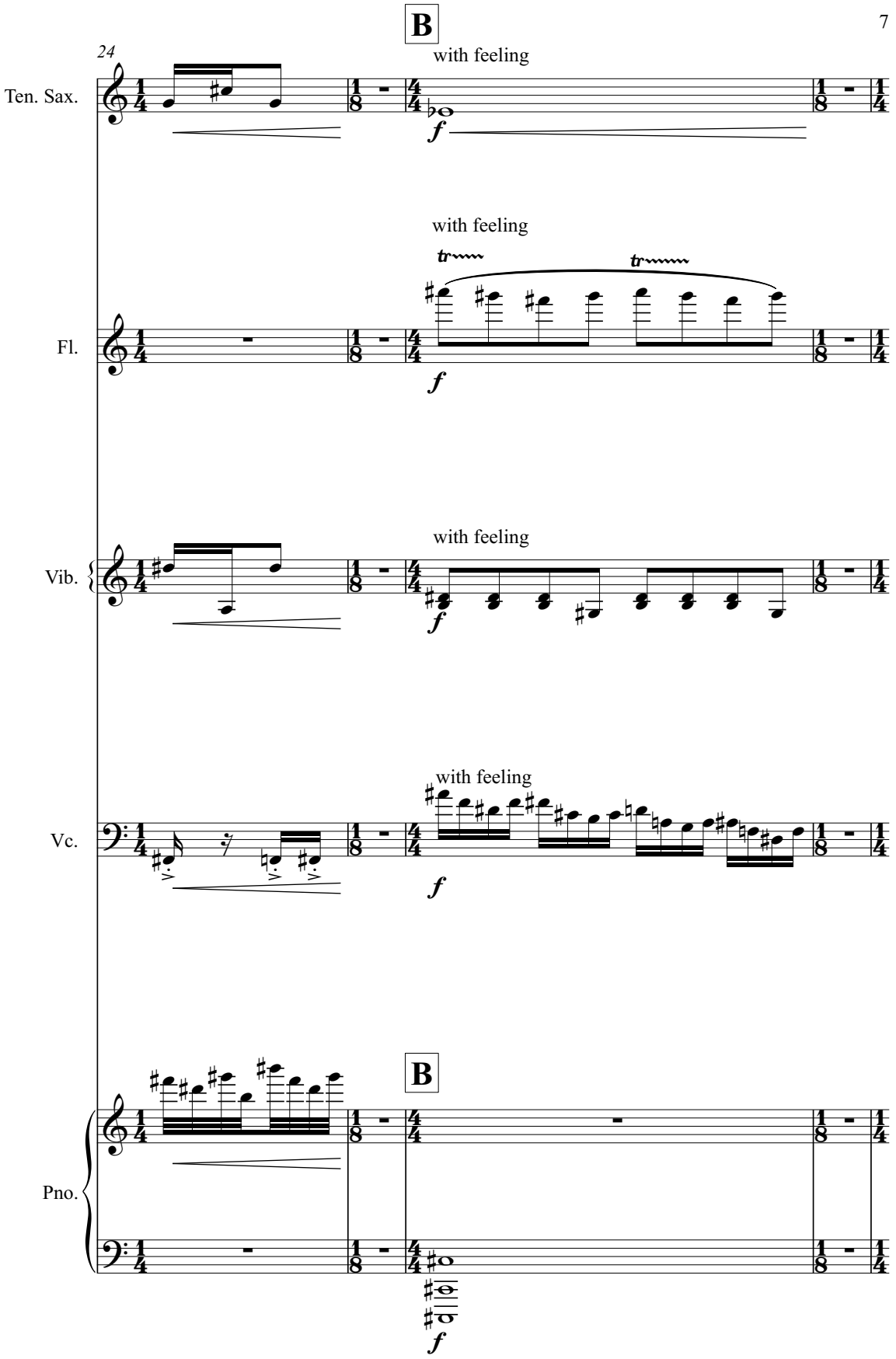


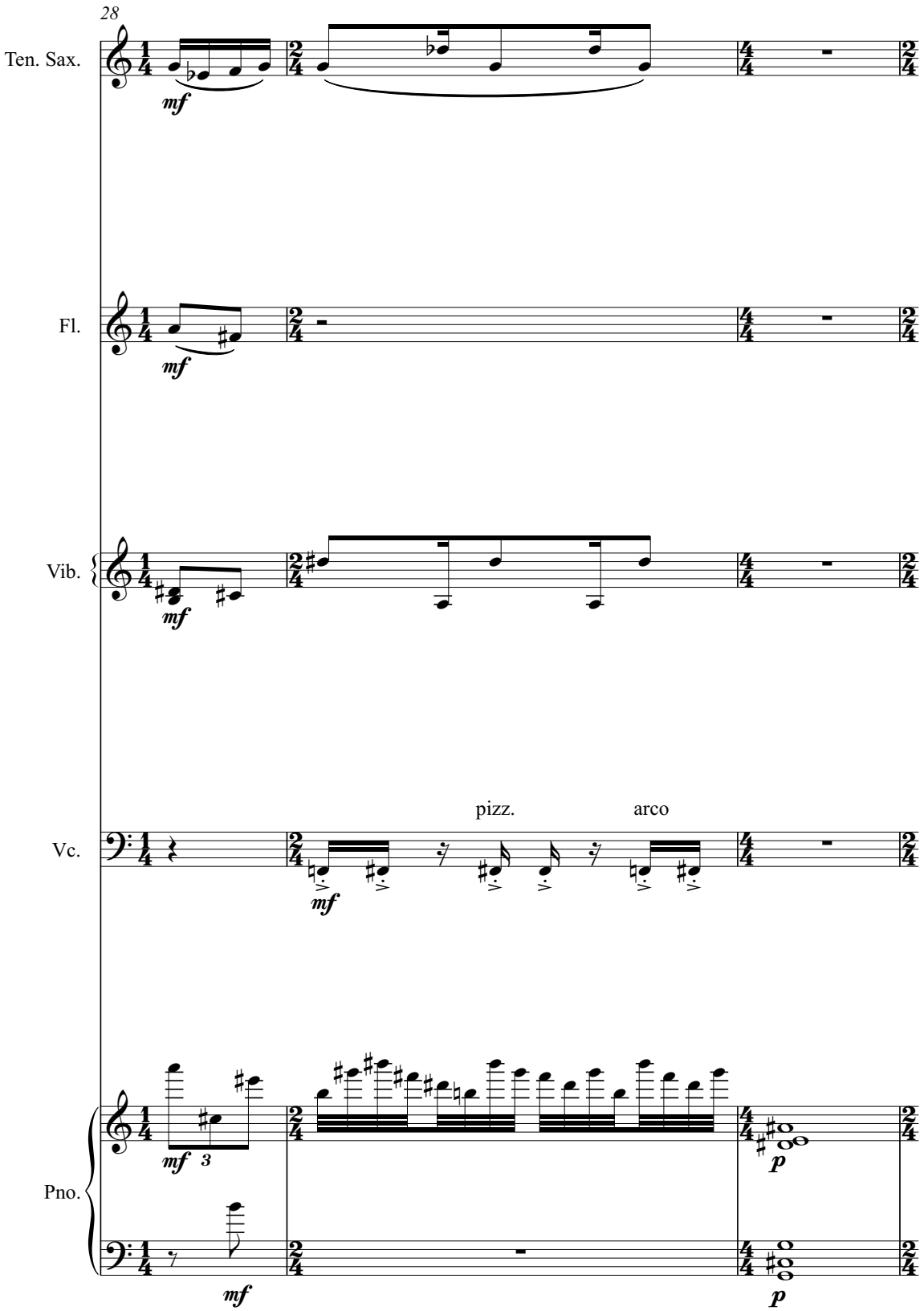

6
Ten. Sax.
Fl.
Vib.
Vc.
pizz.
Pno.
3


11
Ten. Sax.
f
mf
Fl.
f
mf
Vib.
f
mf
arco pizz.
pizz. arco
Vc.
f
Pno.
mf 3
mf

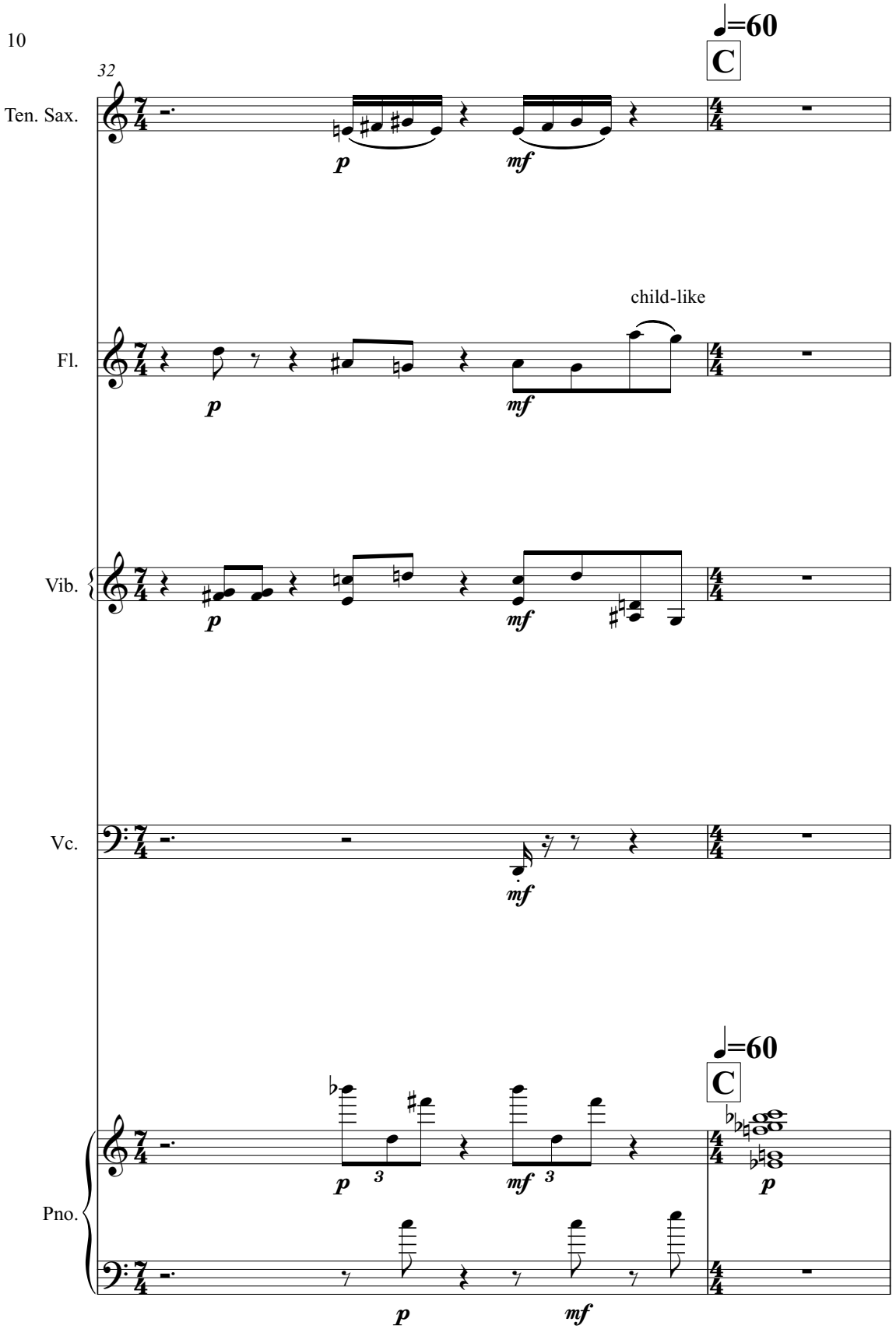

15
Ten. Sax.
3
Fl.
Vib.
pizz.
Vc.
Pno.

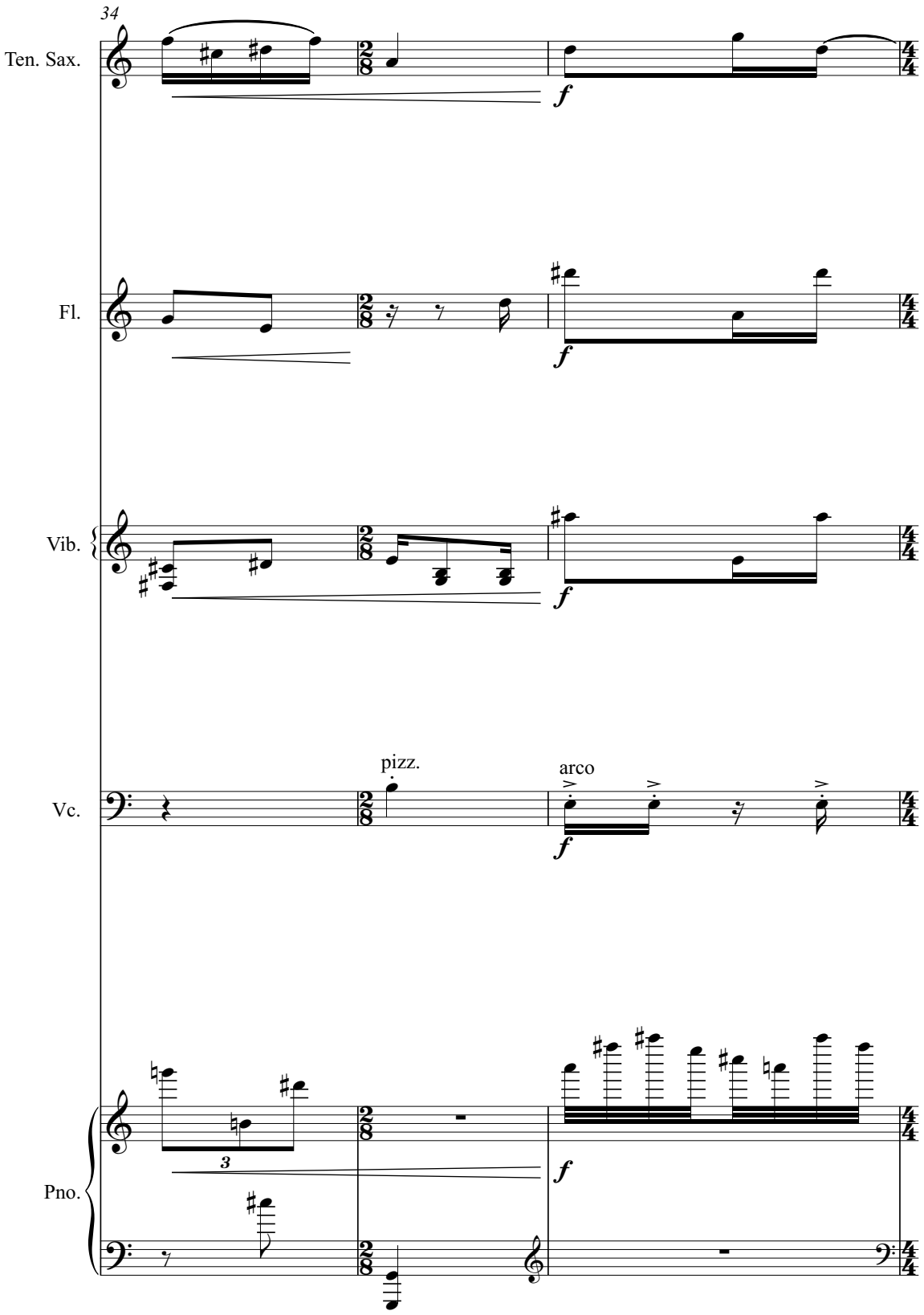

19
A
Ten. Sax.
f
mf
Fl.
f
mf
Vib.
f
mf
arco
Vc.
mf
A
Pno.
f
3
mf
3
f
mf

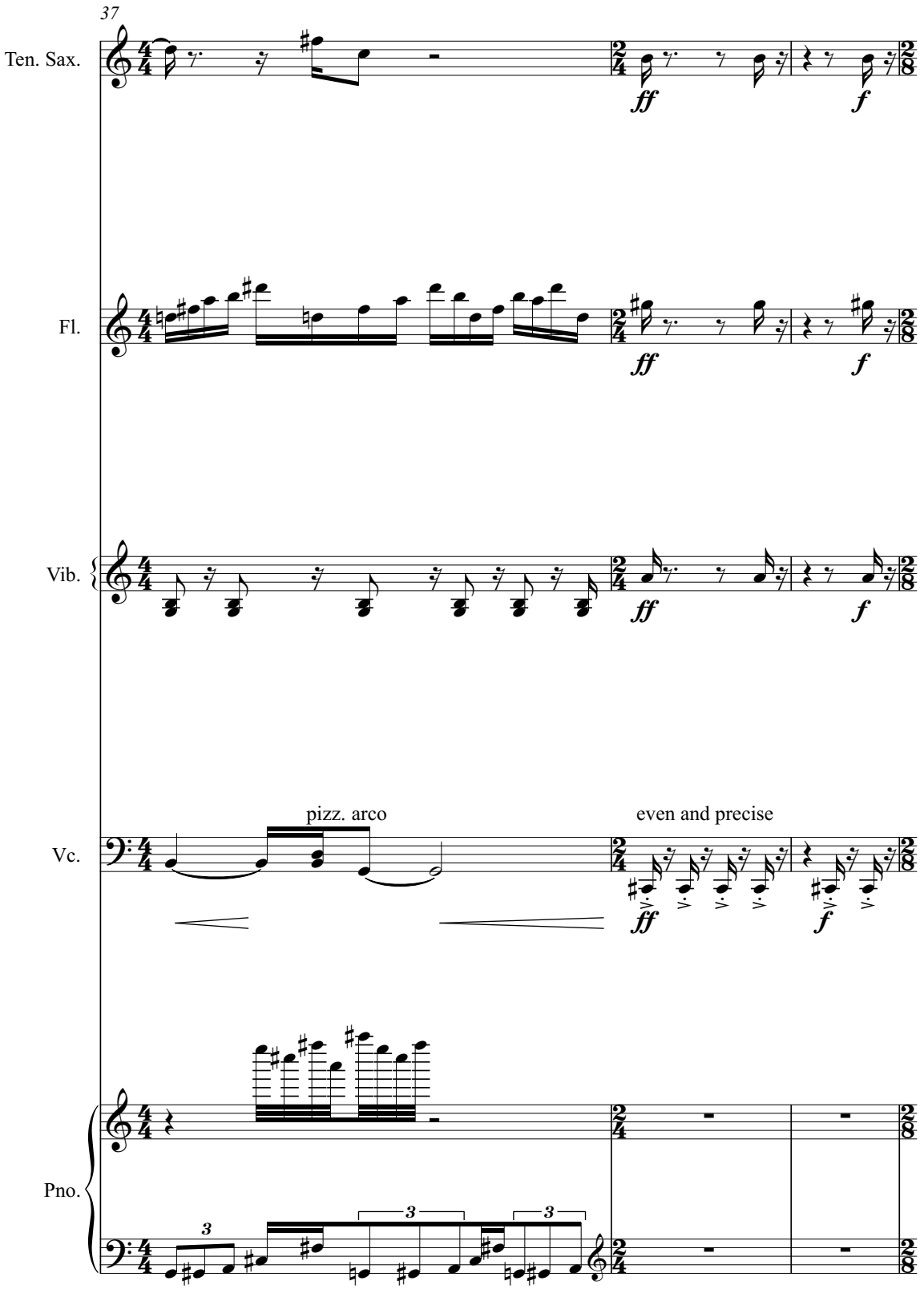

B
24
with feeling
Ten. Sax.
f
with feeling
tr
tr
Fl.
f
with feeling
Vib.
f
with feeling
Vc.
f
B
Pno.
f

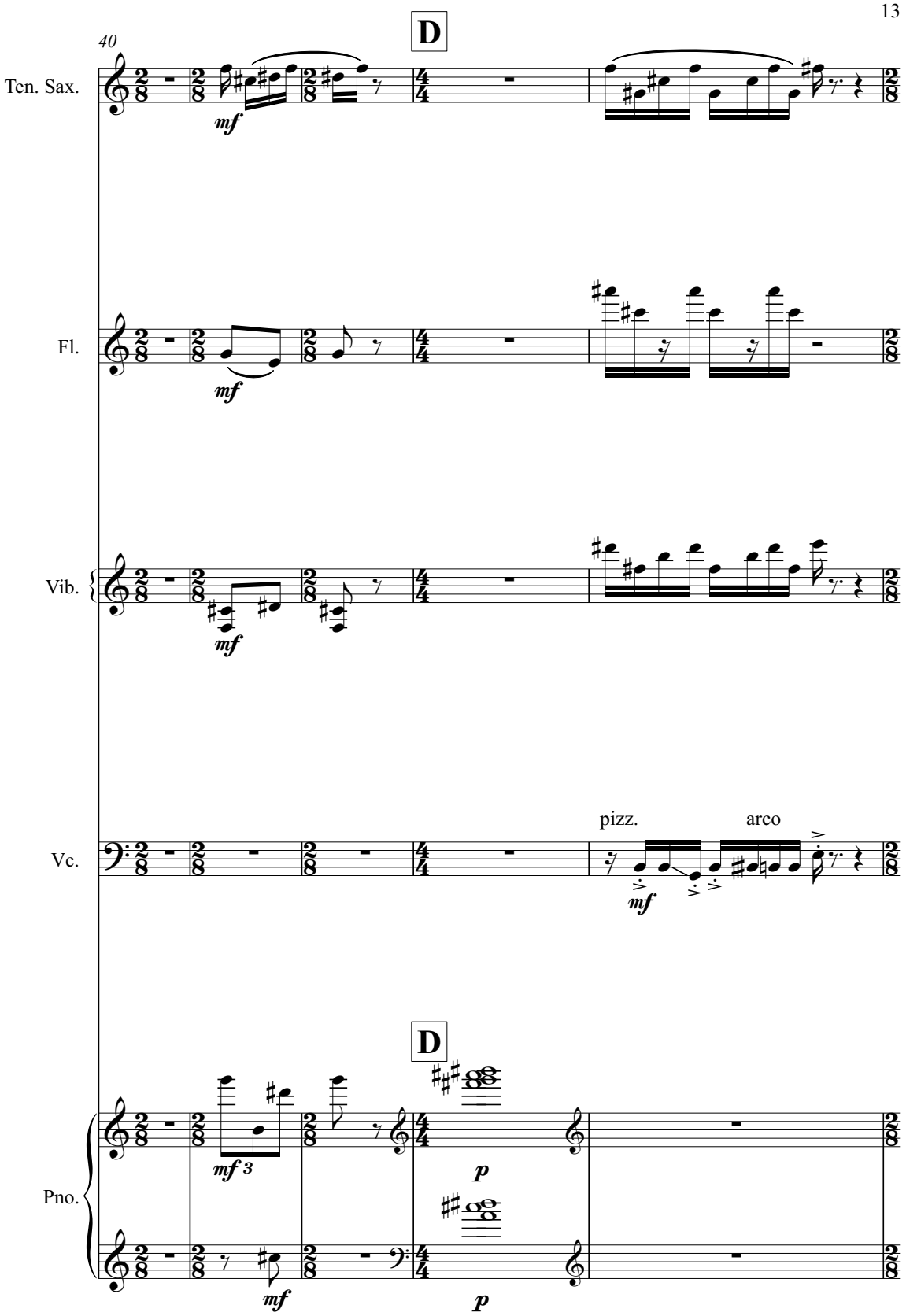

28
Ten. Sax.
mf
Fl.
mf
Vib.
mf
pizz.
arco
Vc.
mf
Pno.
mf 3
p
mf
p

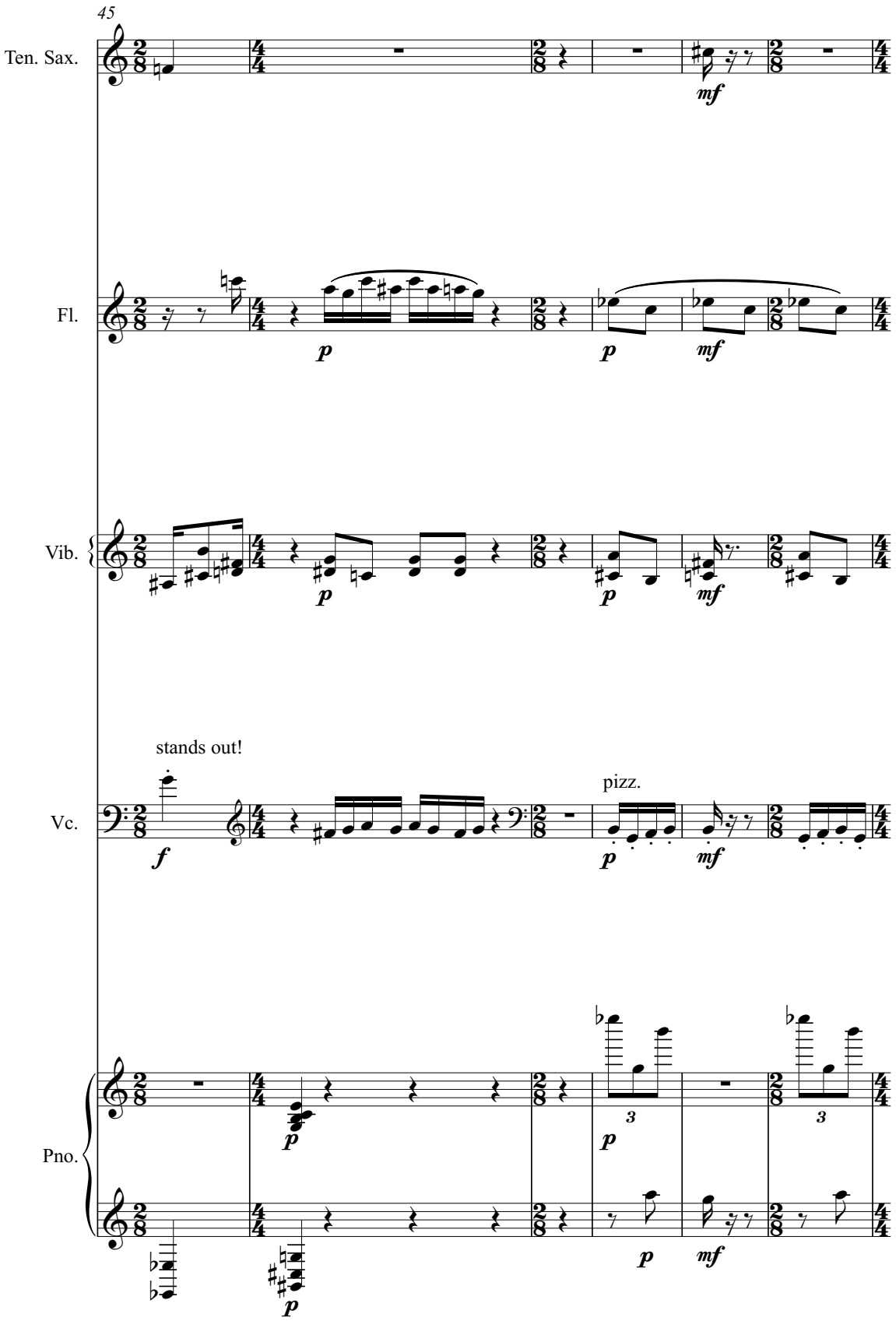
31
Ten. Sax.
Fl.
Vib.
Vc.
7
Pno.

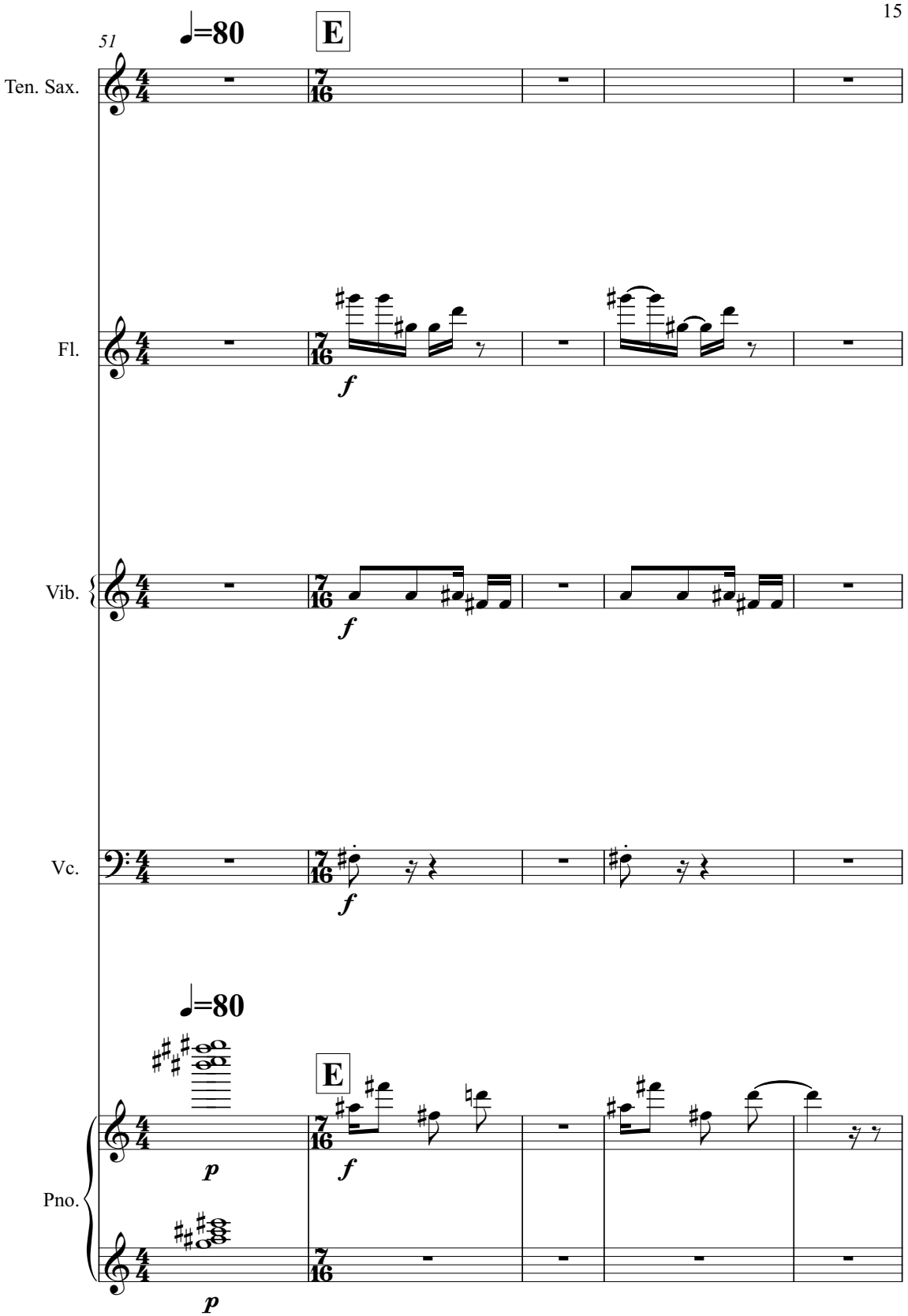

32
♩=60
C
Ten. Sax.
p
mf
child-like
Fl.
p
mf
Vib.
p
mf
Vc.
mf
♩=60
C
Pno.
p
3
mf
3
p
p
mf

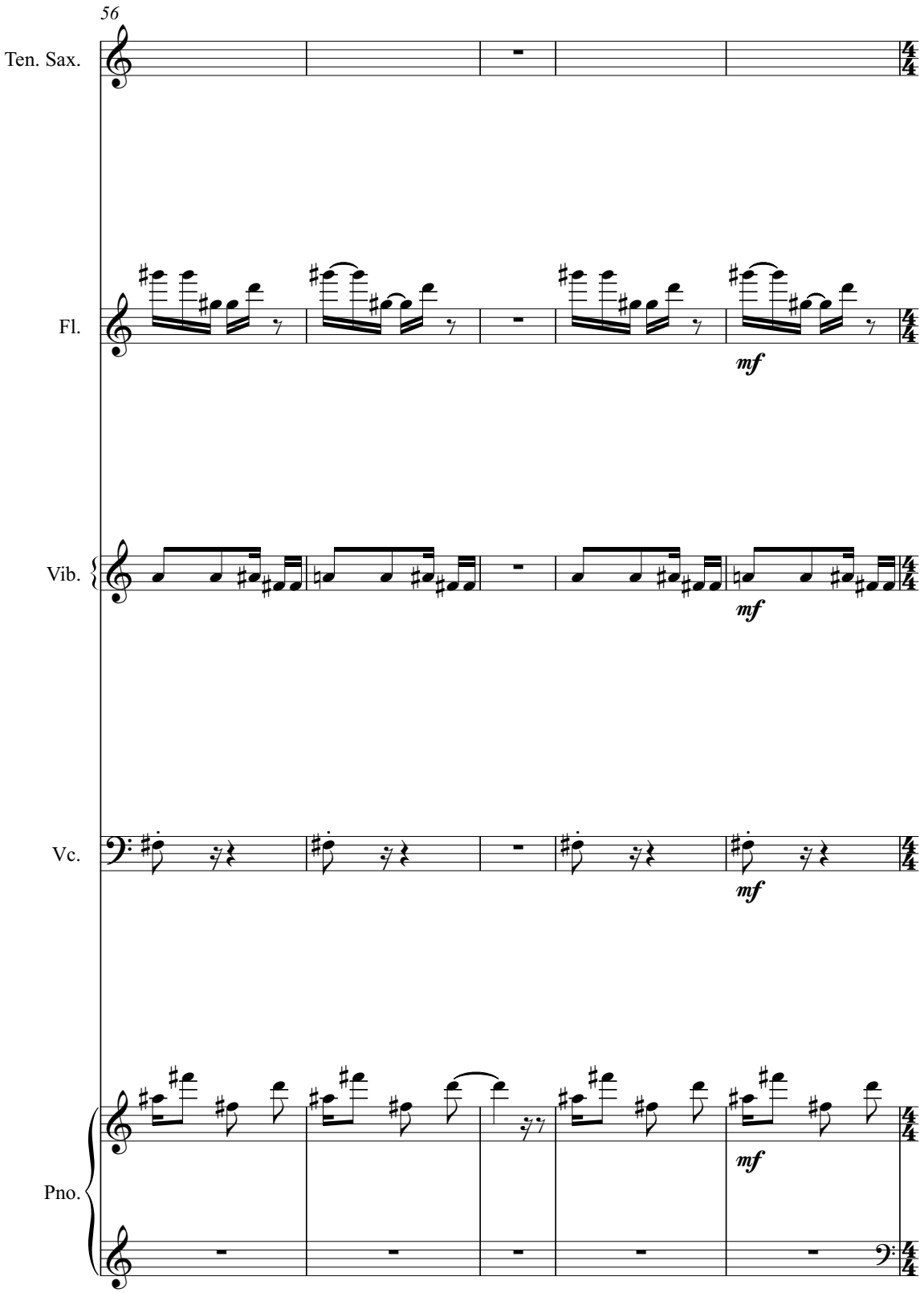

34
Ten. Sax.
Fl.
Vib.
Vc.
pizz.
arco
Pno.
3

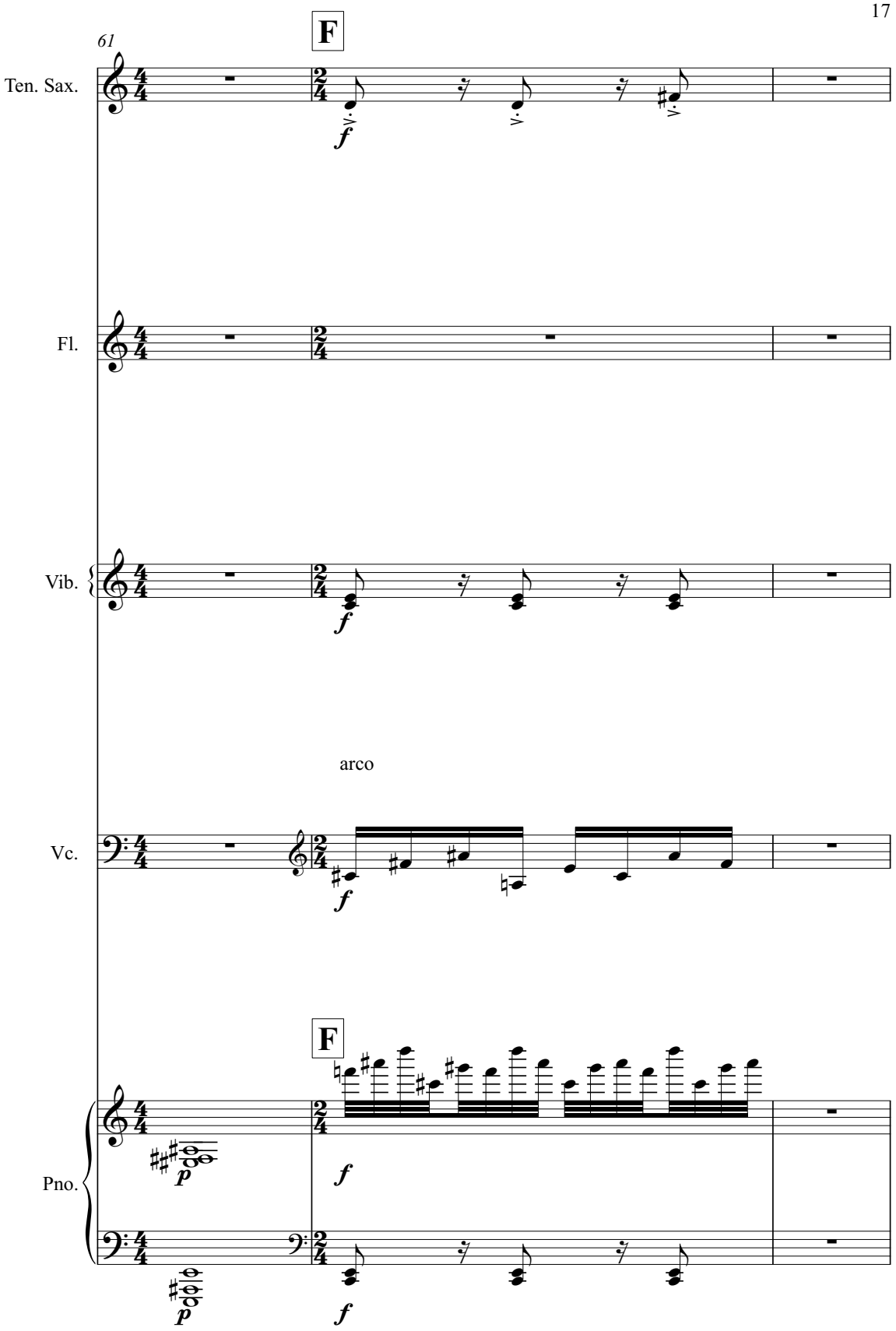

37
Ten. Sax.
Fl.
Vib.
Vc.
Pno.
pizz. arco
even and precise
ff
f
3

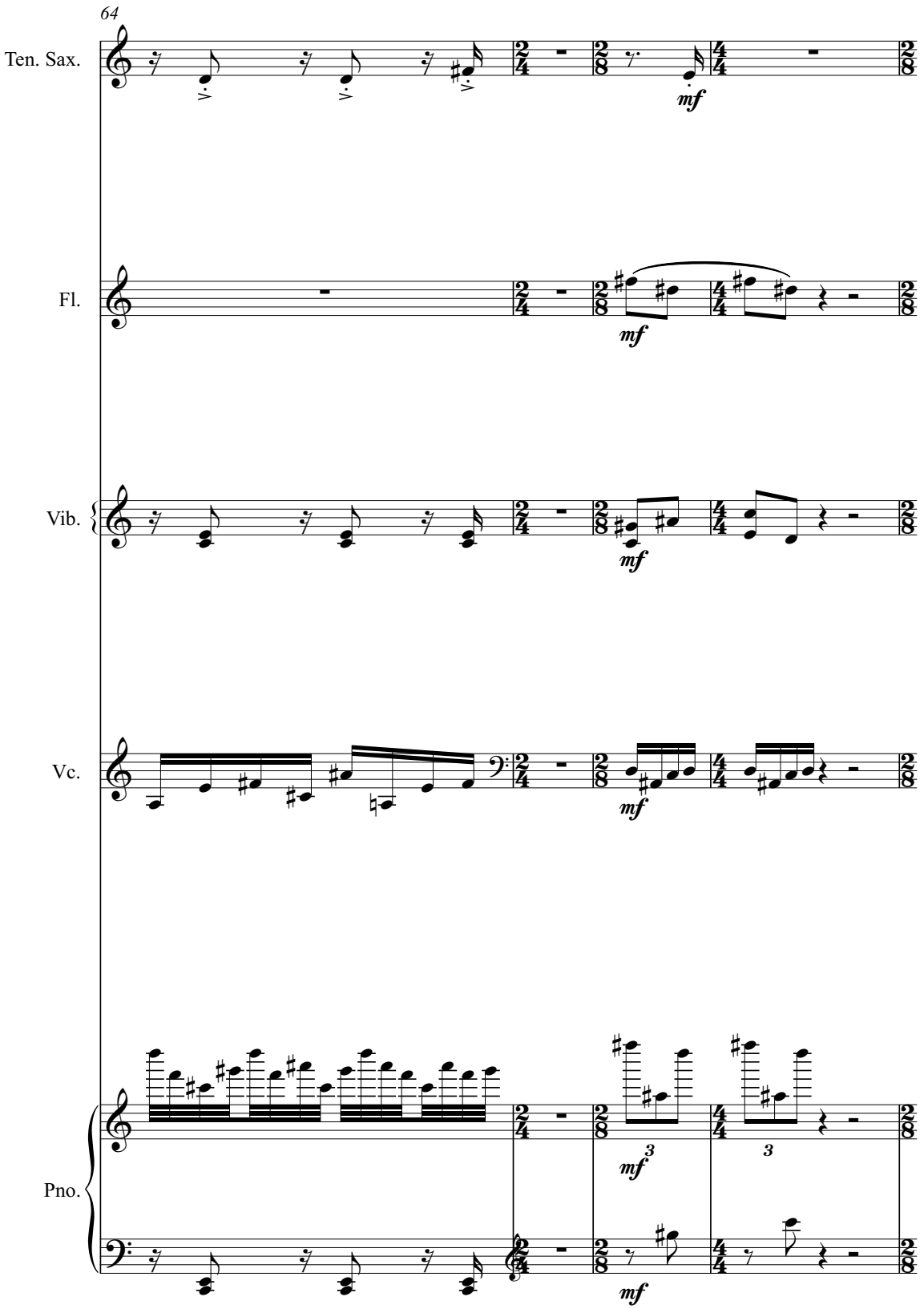

40
D
Ten. Sax.
mf
Fl.
mf
Vib.
mf
Vc.
pizz.
arco
mf
D
Pno.
mf 3
p
mf
p

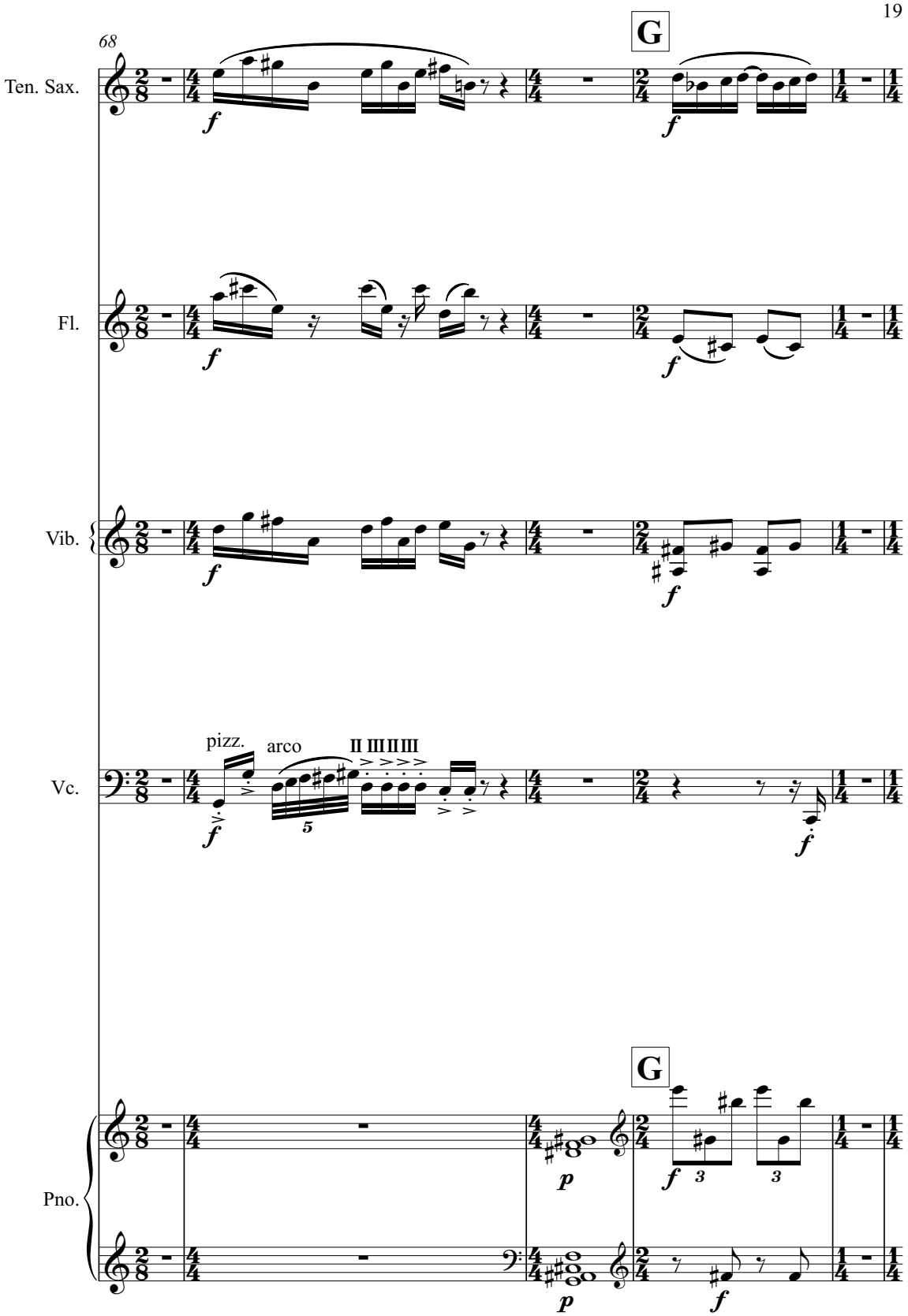

45
Ten. Sax.
mf
Fl.
p
p
mf
Vib.
p
p
mf
stands out!
Vc.
f
pizz.
p
mf
Pno.
p
3
p
3
p
p
mf

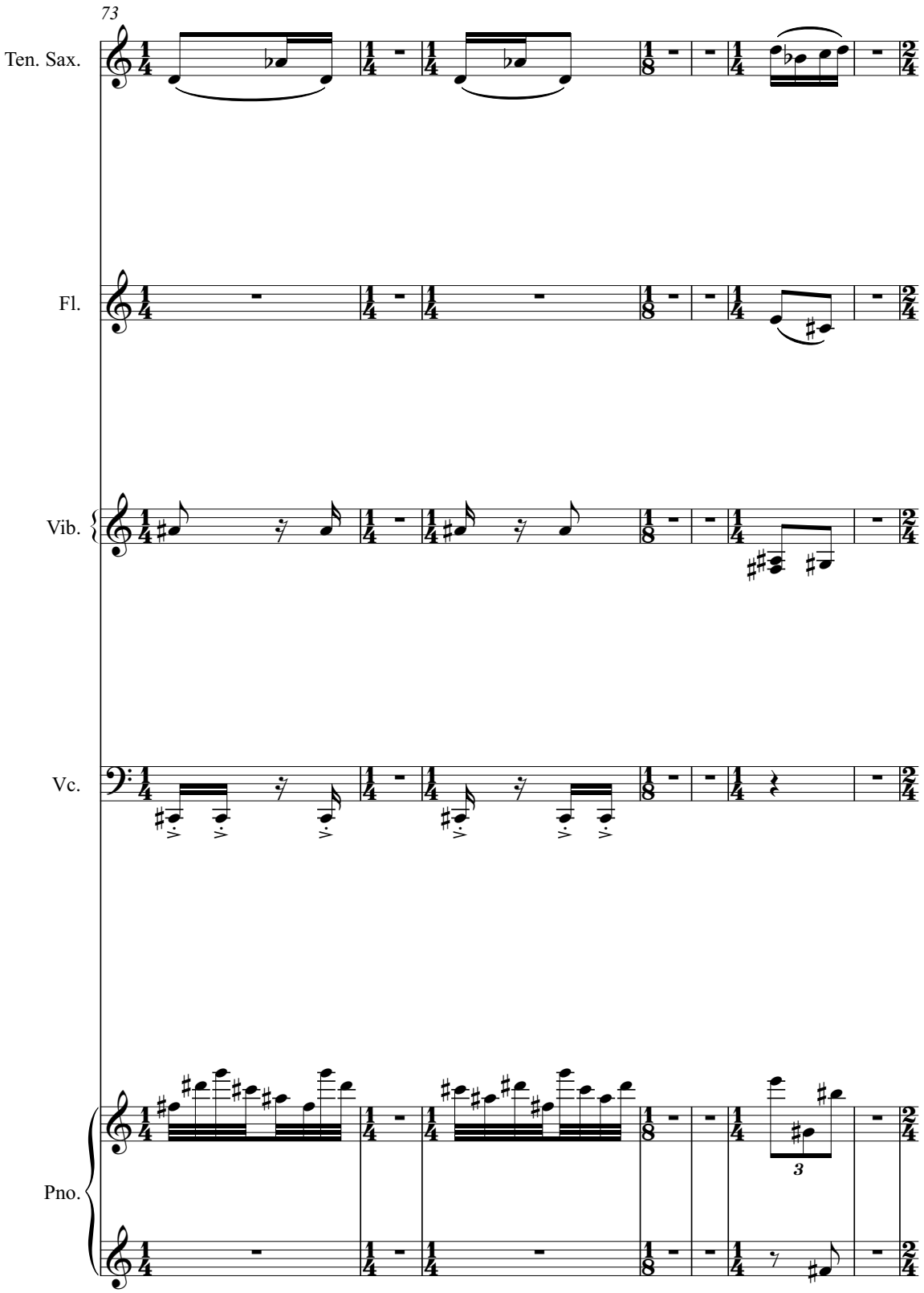

51
♩=80
E
Ten. Sax.
Fl.
Vib.
Vc.
Pno.
f
p

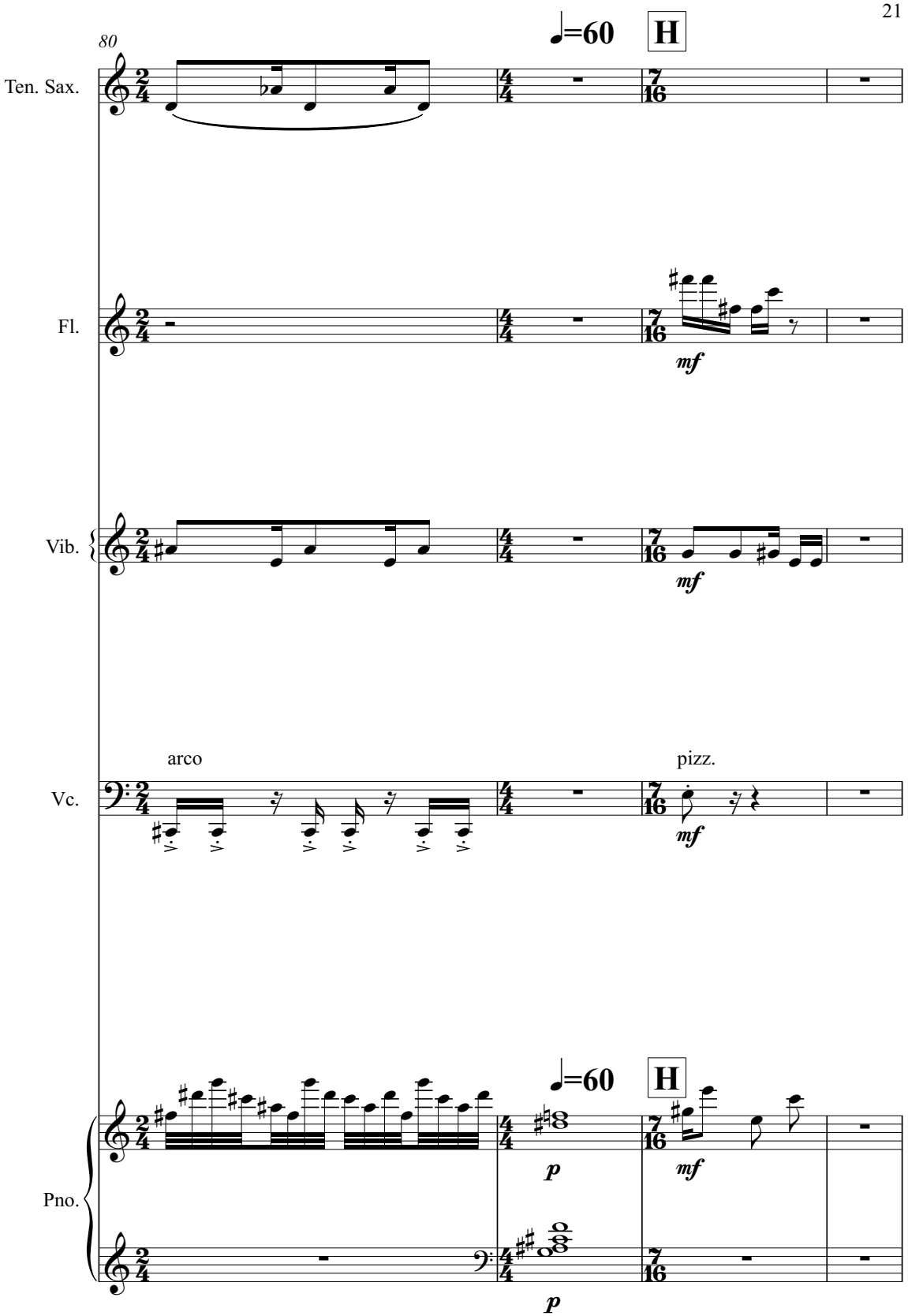

56
Ten. Sax.
Fl.
mf
Vib.
mf
Vc.
mf
Pno.
mf

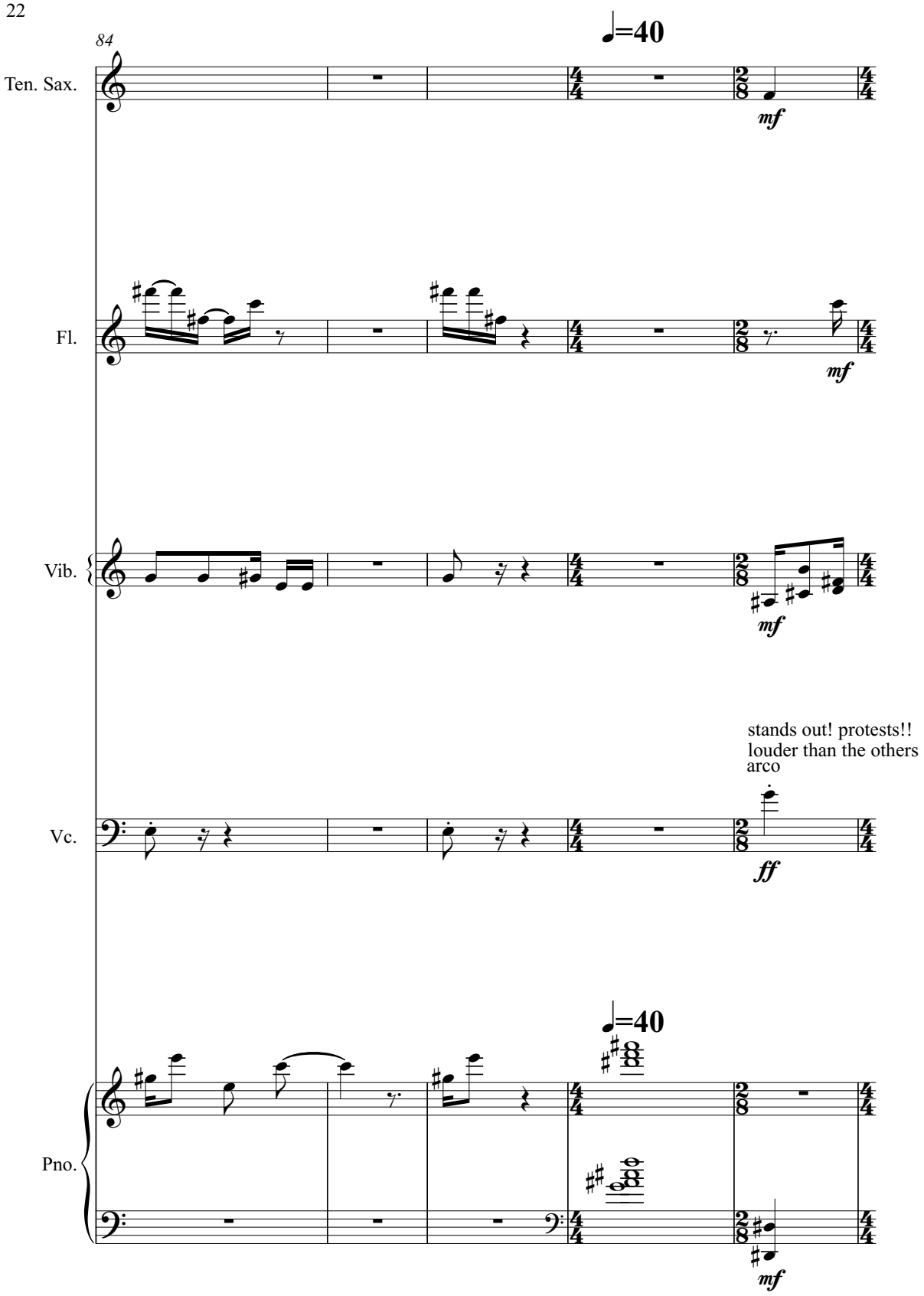

61
F
Ten. Sax.
f
Fl.
Vib.
f
arco
Vc.
f
F
Pno.
p
f
p
f

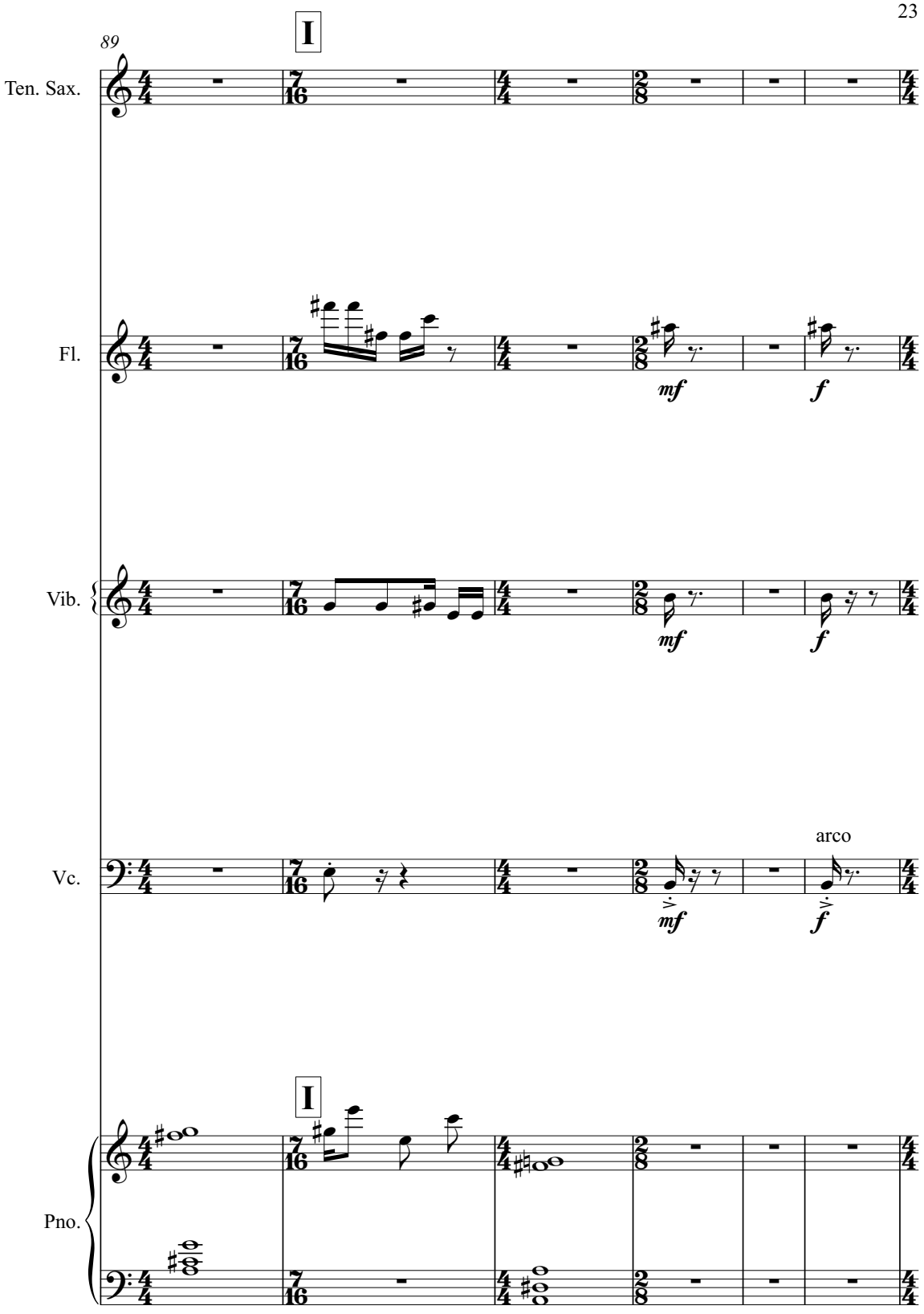

64
Ten. Sax.
mf
Fl.
mf
Vib.
mf
Vc.
mf
Pno.
mf
3
3
mf

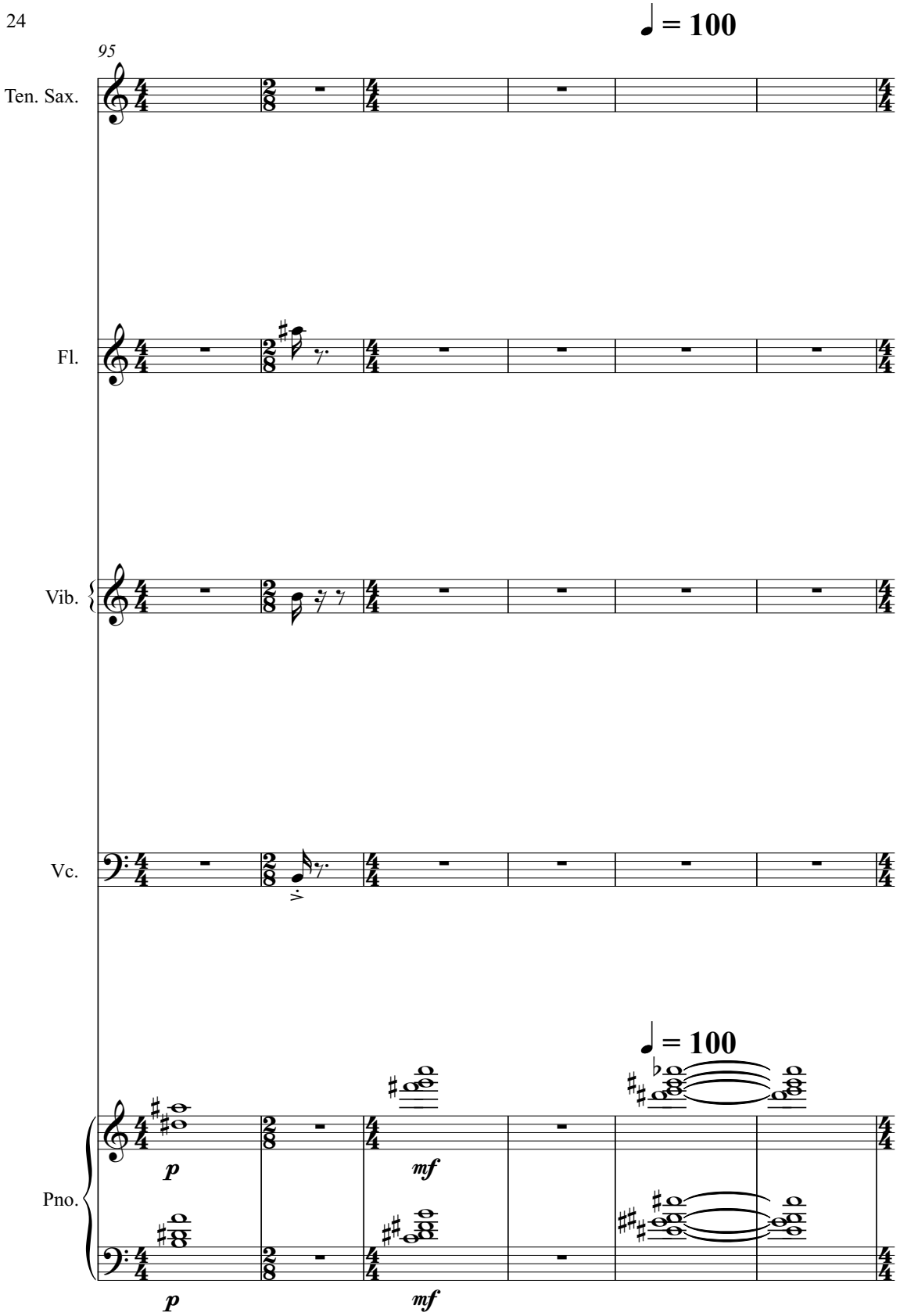

68
G
Ten. Sax.
Fl.
Vib.
Vc.
pizz.
arco
II III II III
G
Pno.

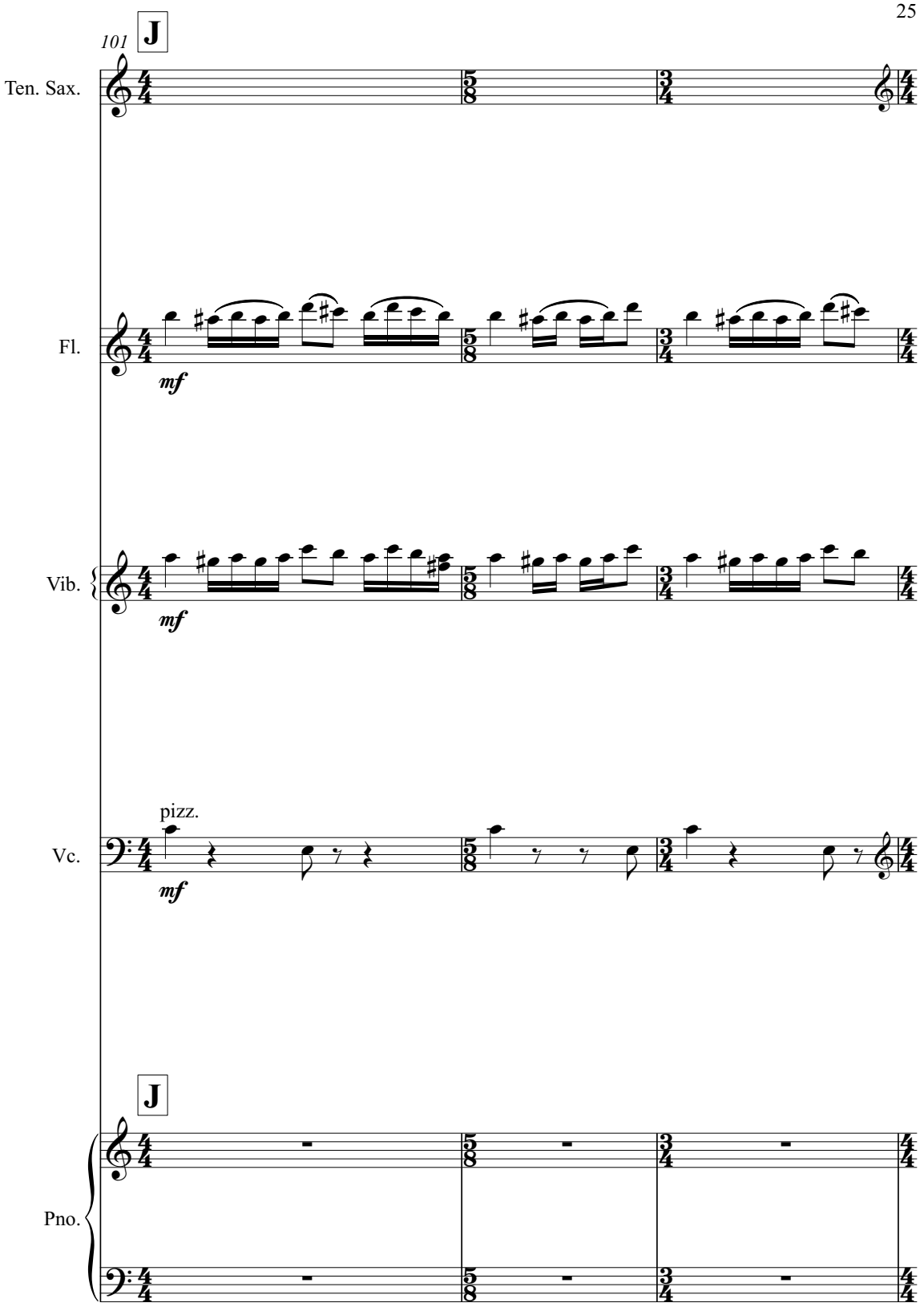

73
Ten. Sax.
Fl.
Vib.
Vc.
Pno.
3

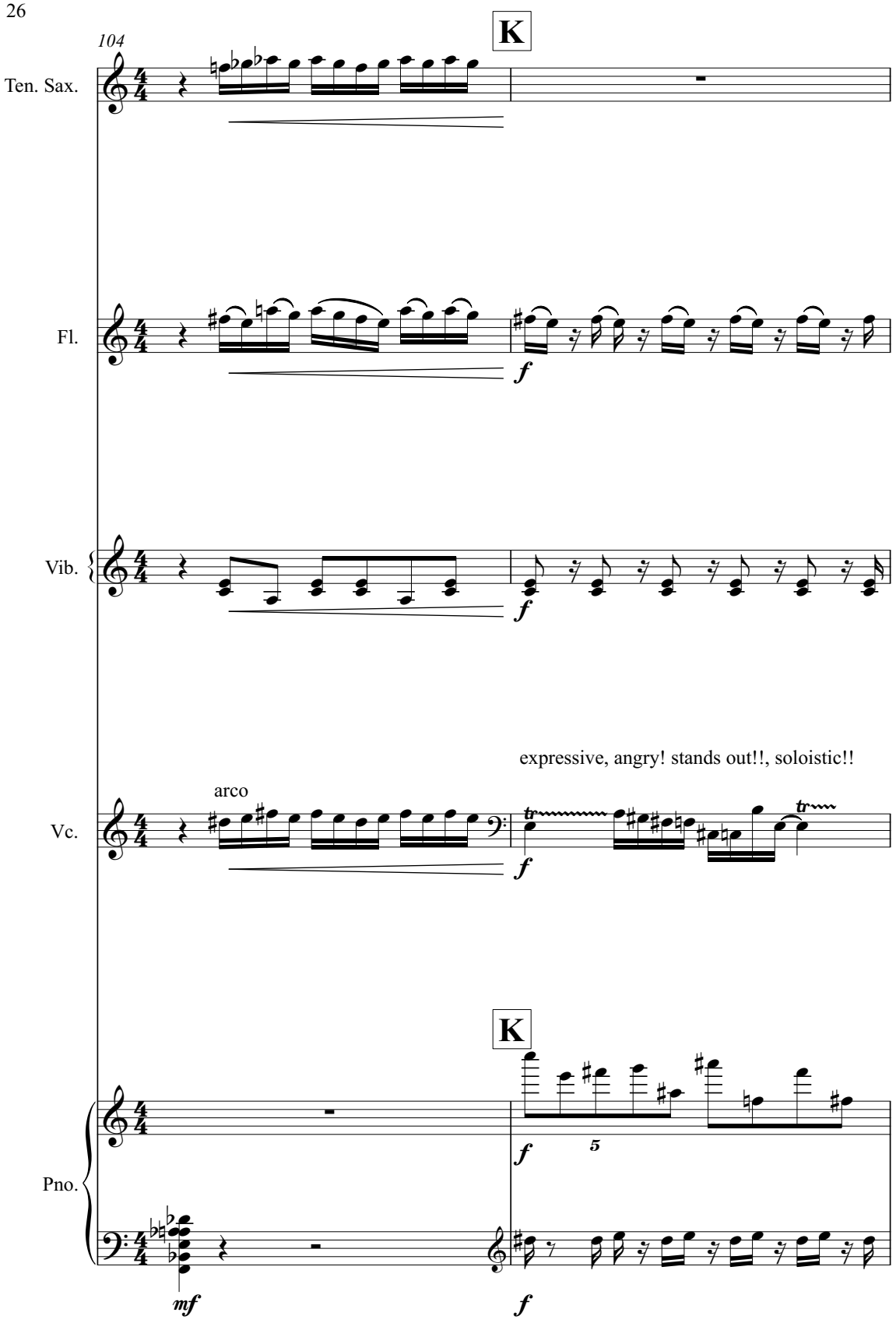

80
♩=60
H
Ten. Sax.
Fl.
mf
Vib.
mf
arco
pizz.
Vc.
mf
♩=60
H
Pno.
p
mf
p

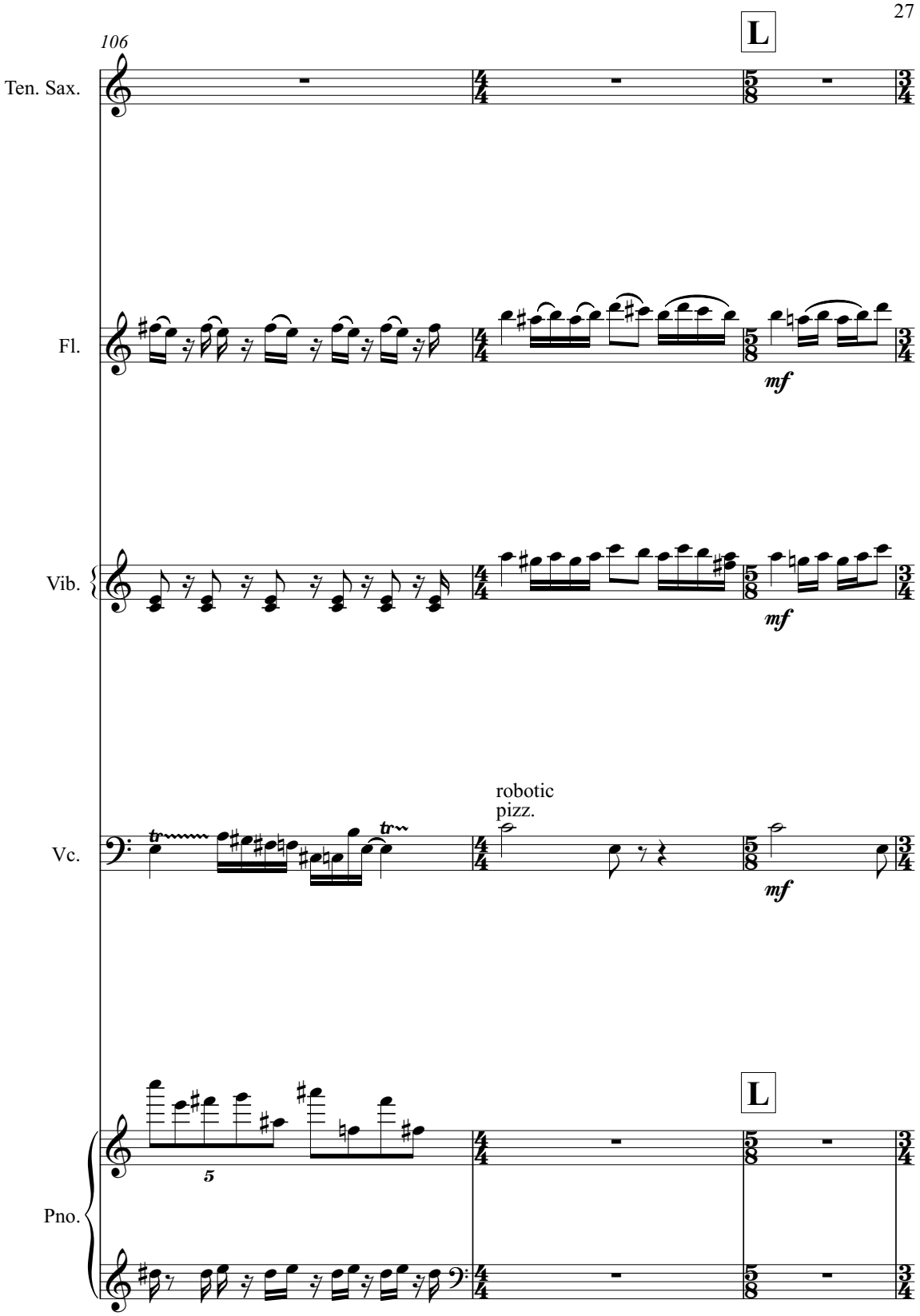

84
♩=40
Ten. Sax.
mf
Fl.
mf
Vib.
mf
stands out! protests!!
louder than the others
arco
Vc.
ff
♩=40
Pno.
mf

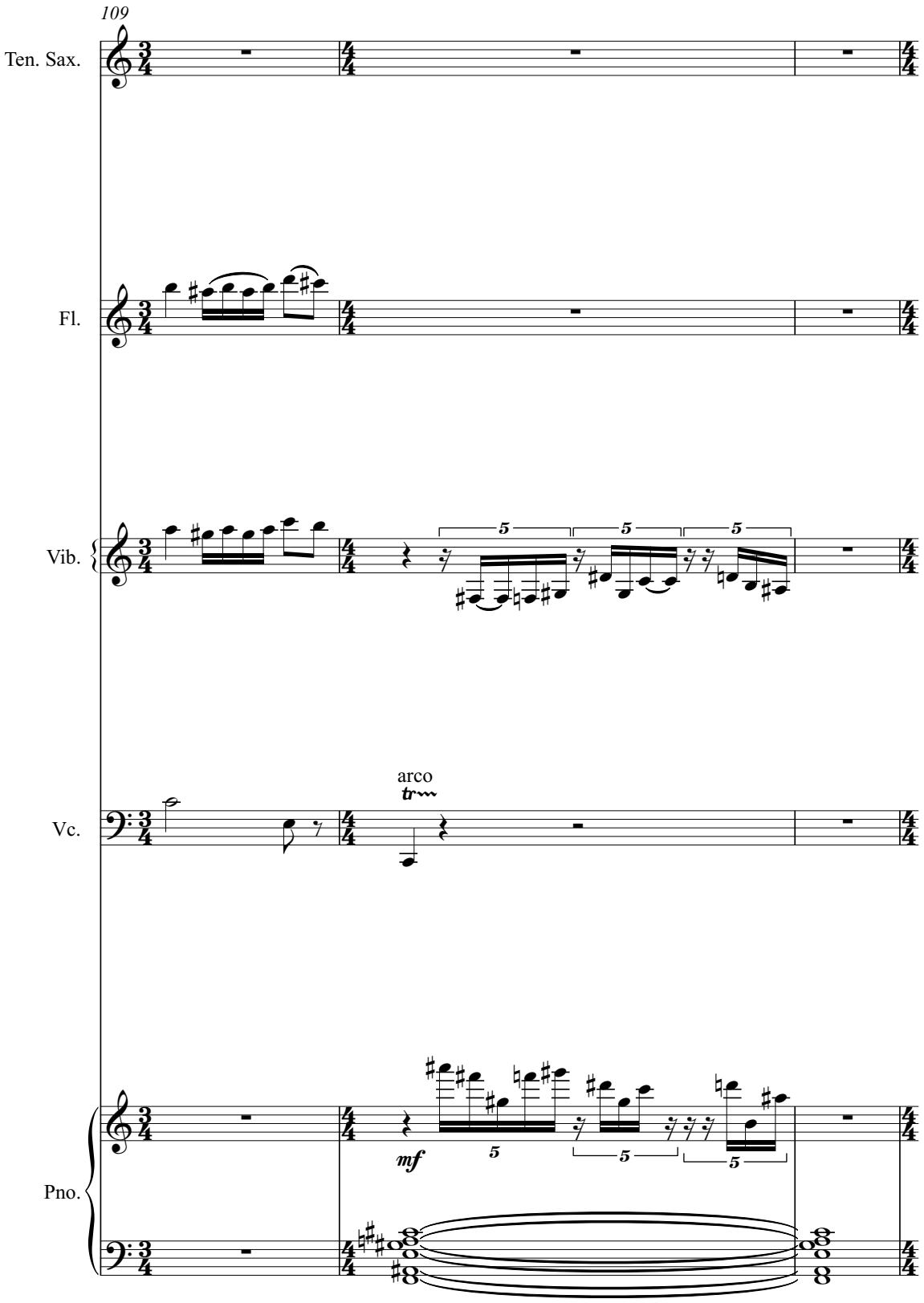

89
I
Ten. Sax.
Fl.
mf
f
Vib.
mf
f
Vc.
arco
mf
f
I
Pno.

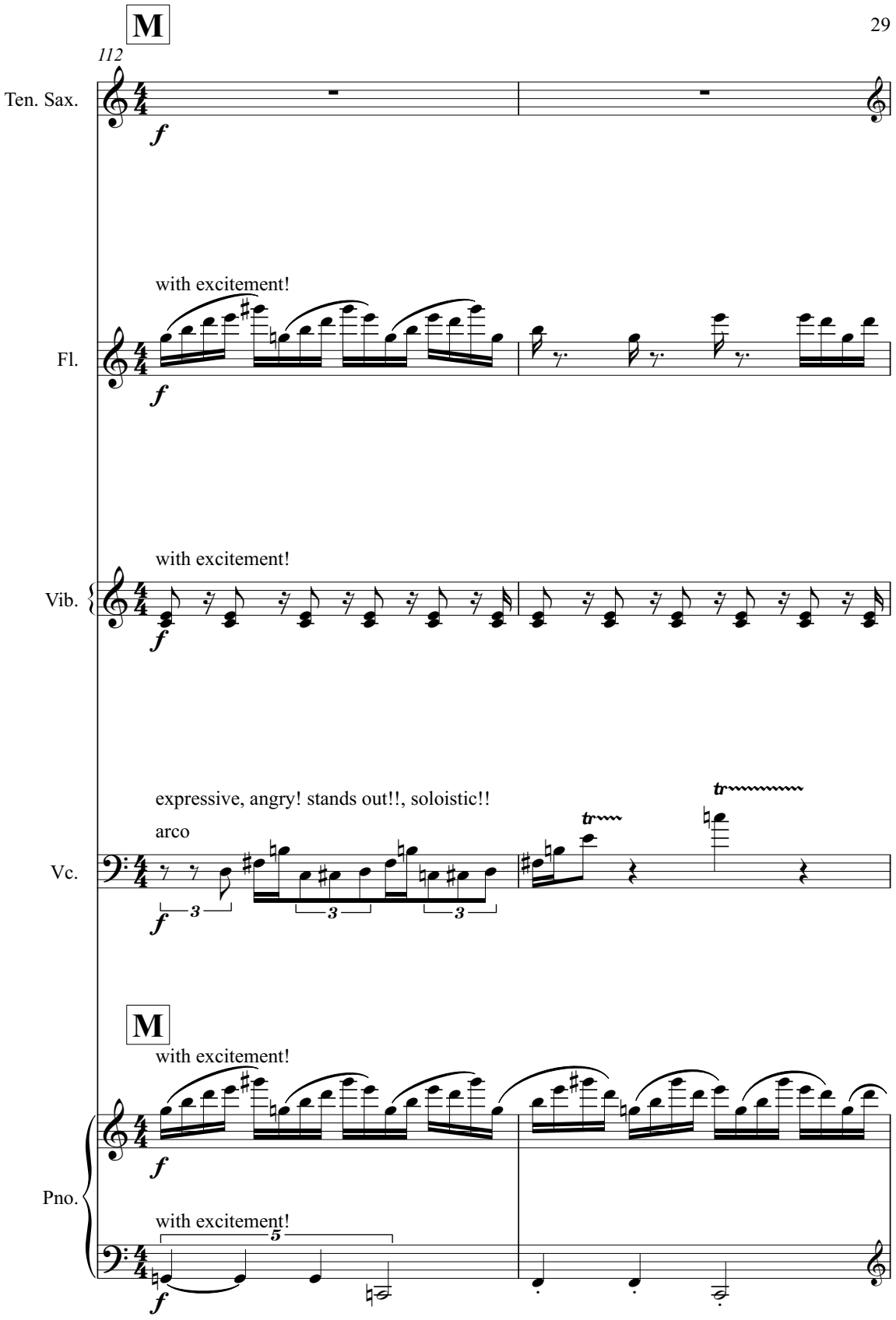

♩ = 100
95
Ten. Sax.
Fl.
Vib.
Vc.
♩ = 100
Pno.
p
mf
p
mf

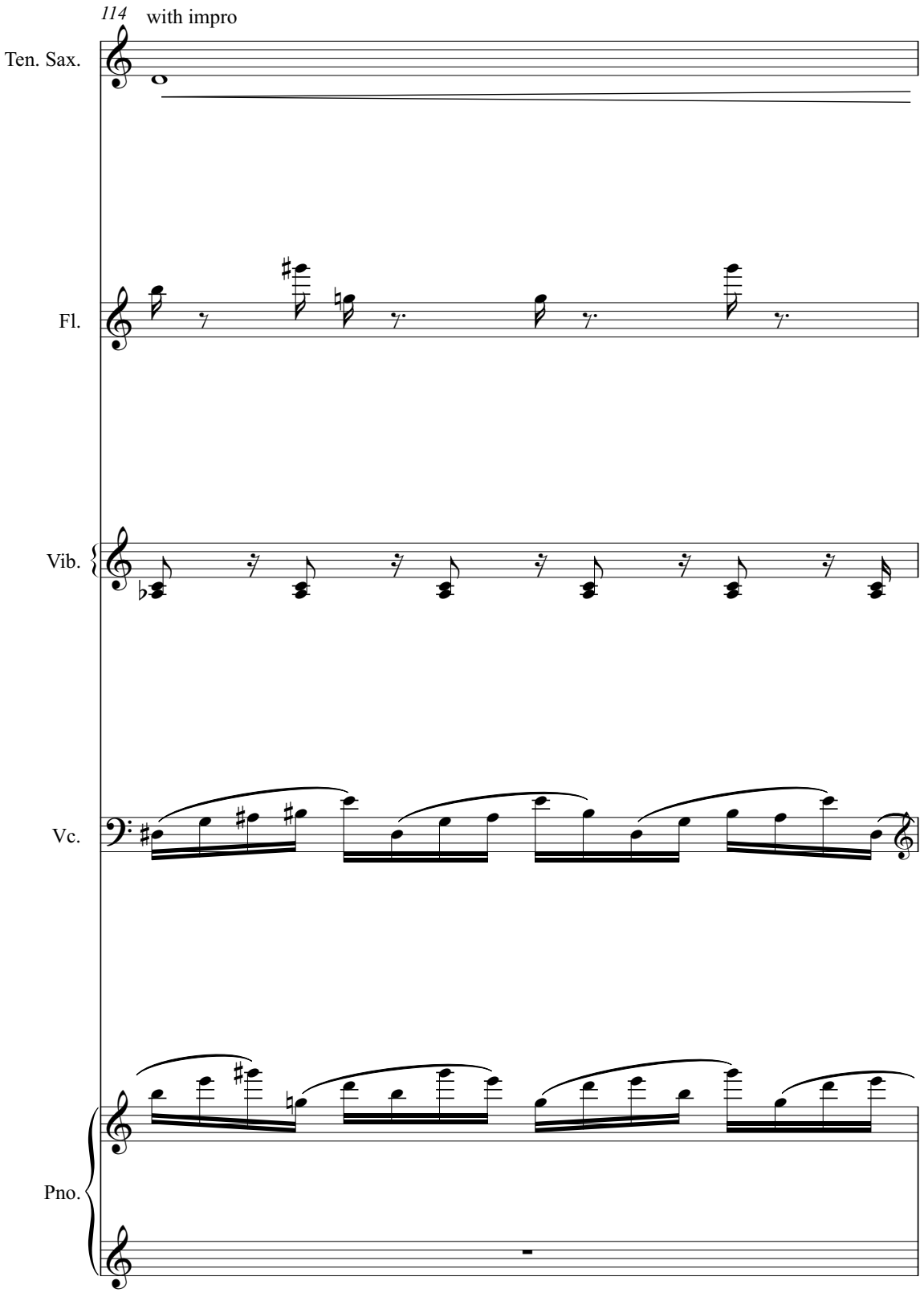

101
J
Ten. Sax.
Fl.
mf
Vib.
mf
pizz.
Vc.
mf
J
Pno.

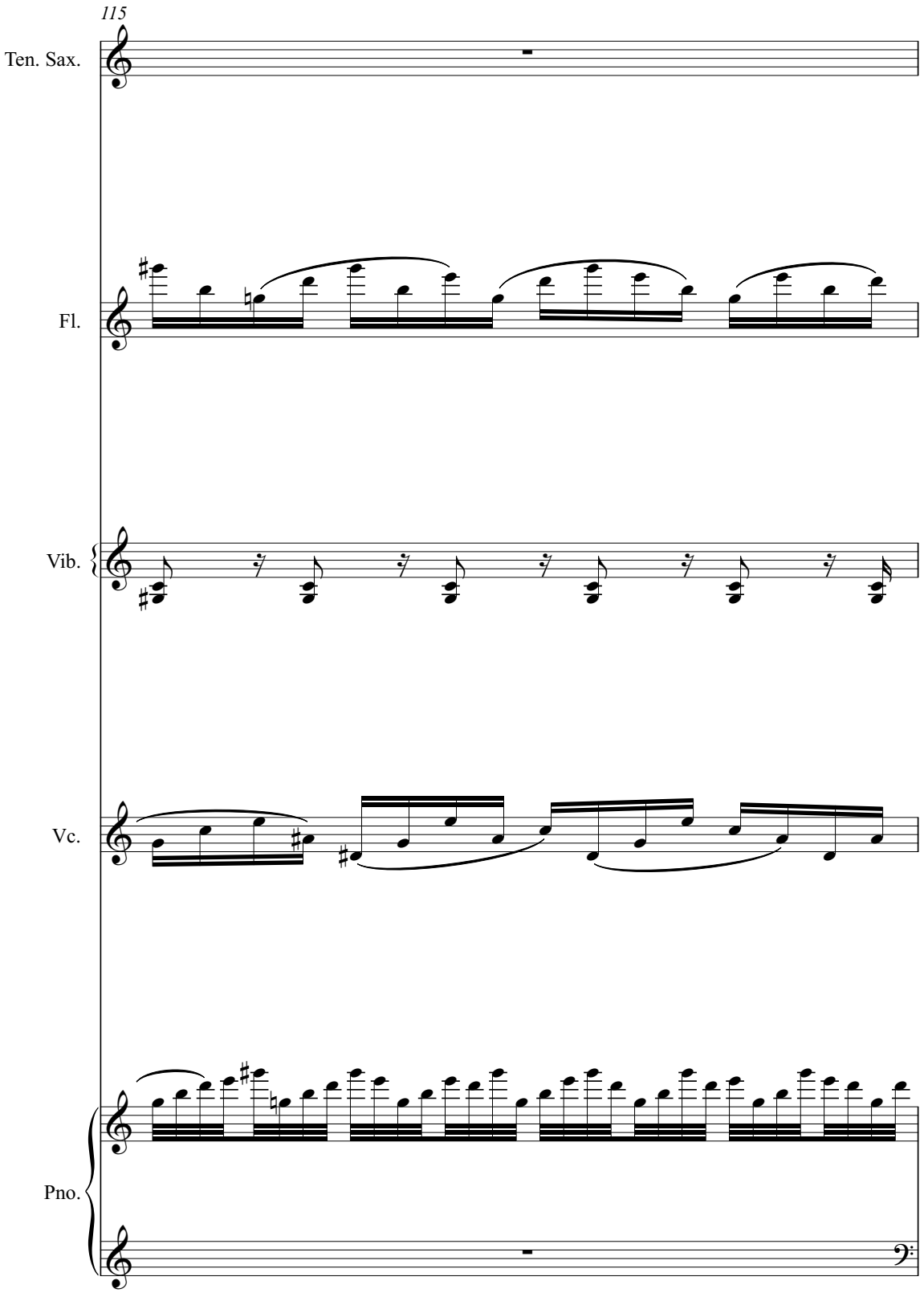

104
K
Ten. Sax.
Fl.
f
Vib.
f
expressive, angry! stands out!!, soloistic!!
arco
Vc.
f
K
Pno.
f
5
mf
f

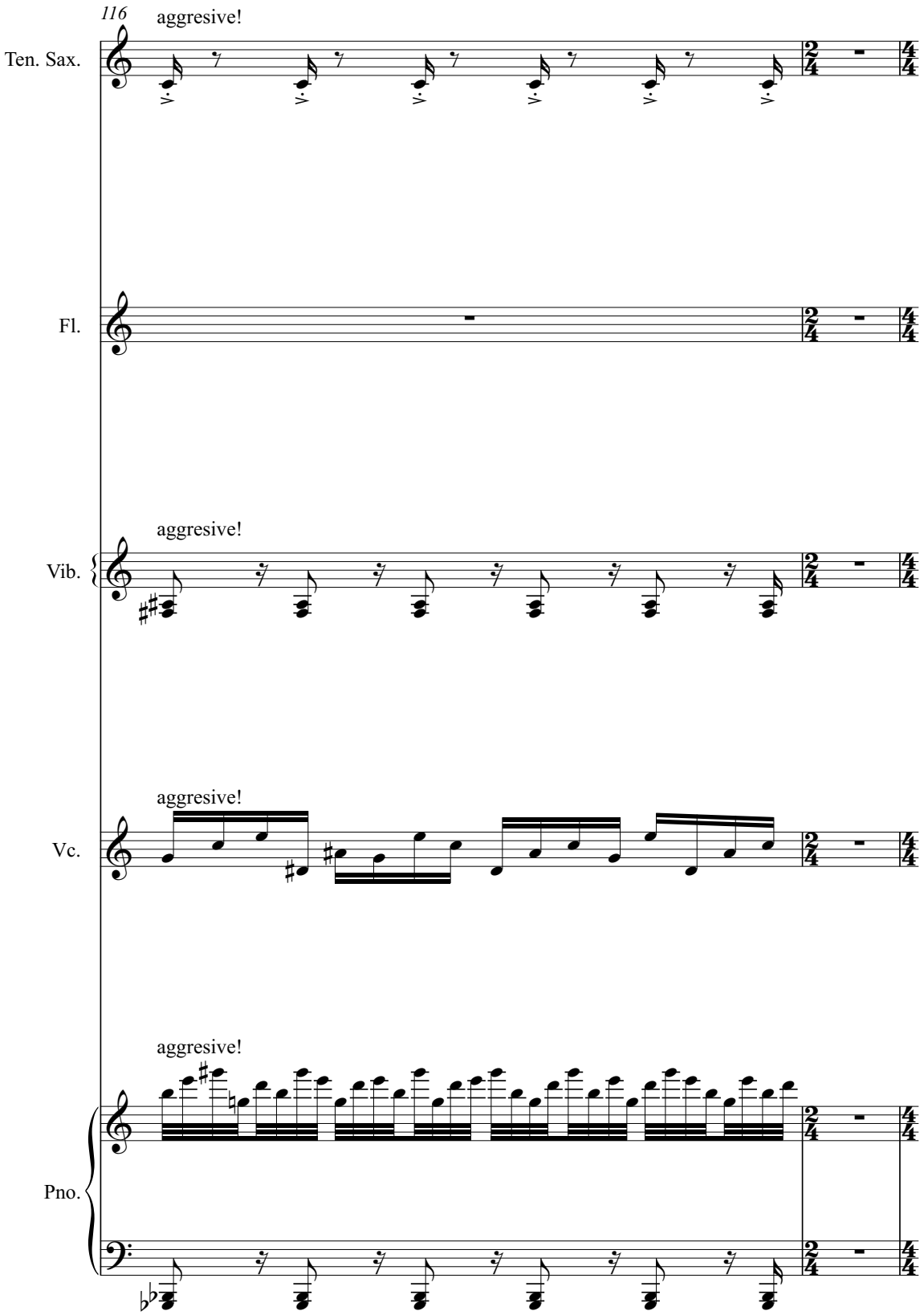

106
L
Ten. Sax.
Fl.
mf
Vib.
mf
robotic
pizz.
Vc.
mf
L
Pno.
5

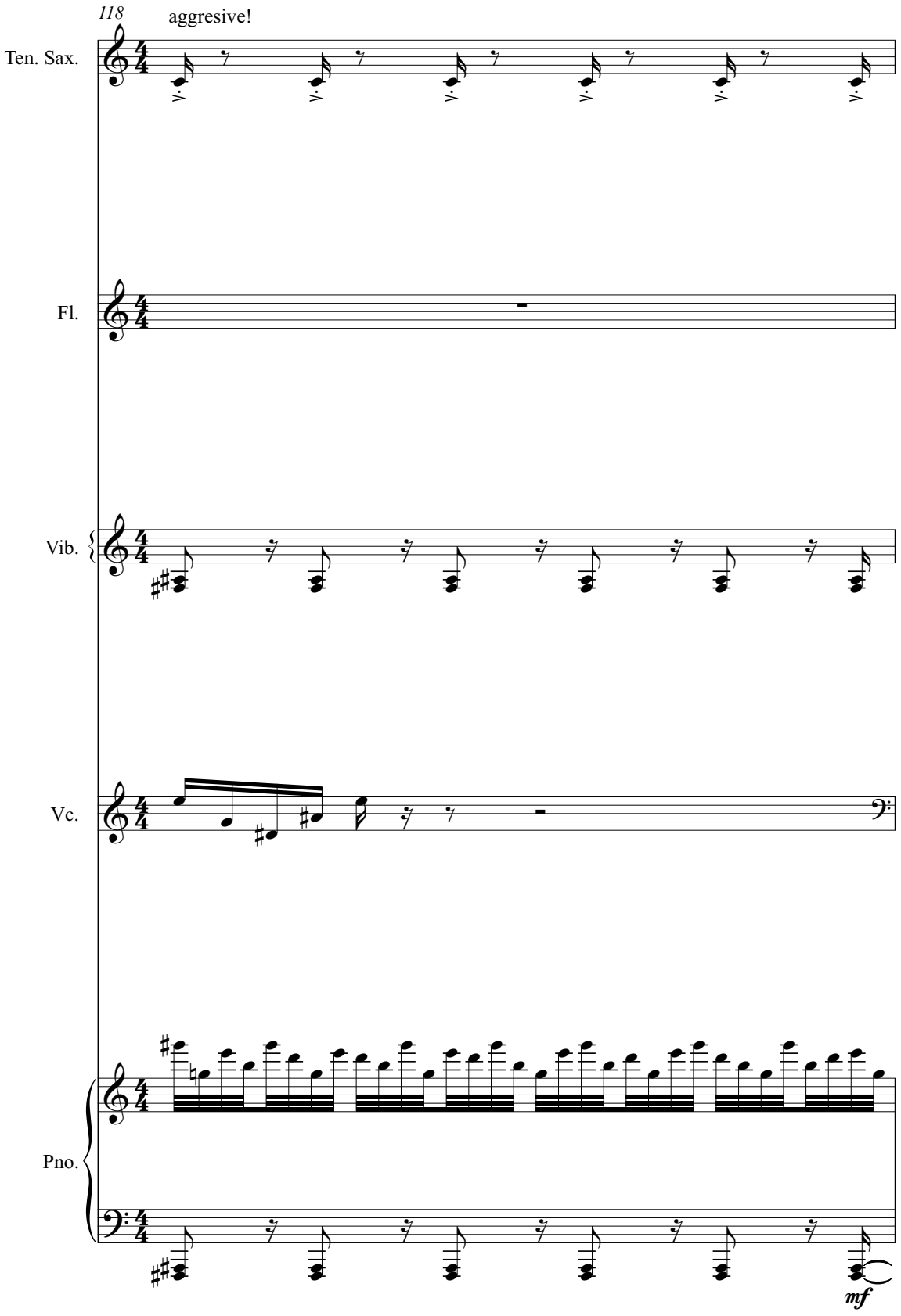

109
Ten. Sax.
Fl.
Vib.
Vc.
arco
tr
Pno.
mf
5
5
5
5
5
5

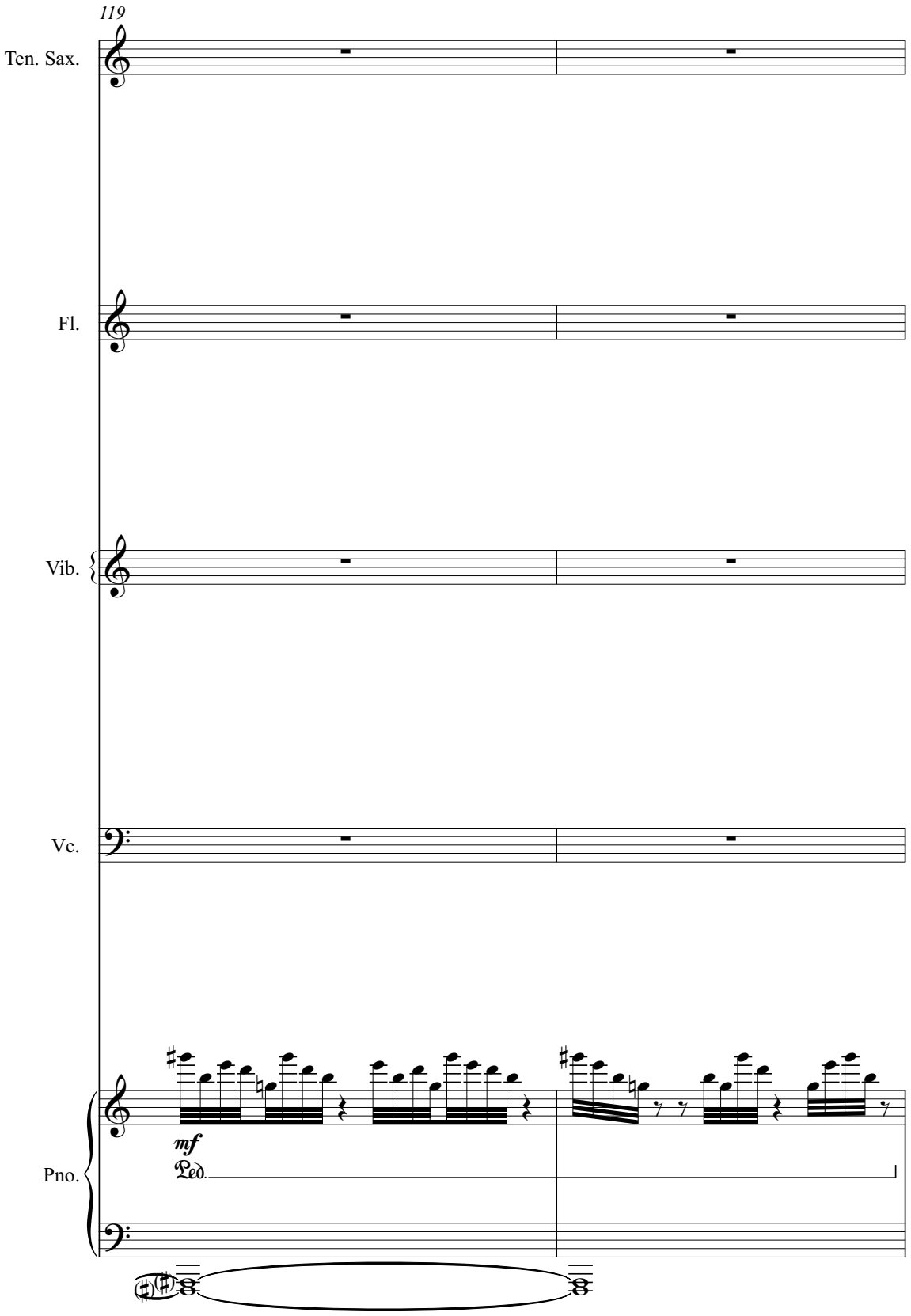

M
112
Ten. Sax.
f
with excitement!
Fl.
f
with excitement!
Vib.
f
expressive, angry! stands out!!, soloistic!!
arco
Vc.
f
3
3
3
tr
tr
M
with excitement!
Pno.
f
with excitement!
5
f


114
with impro
Ten. Sax.
Fl.
Vib.
Vc.
Pno.


115
Ten. Sax.
Fl.
Vib.
Vc.
Pno.


116
aggresive!
Ten. Sax.
Fl.
aggresive!
Vib.
aggresive!
Vc.
aggresive!
Pno.


118
aggresive!
Ten. Sax.
Fl.
Vib.
Vc.
Pno.
mf


119
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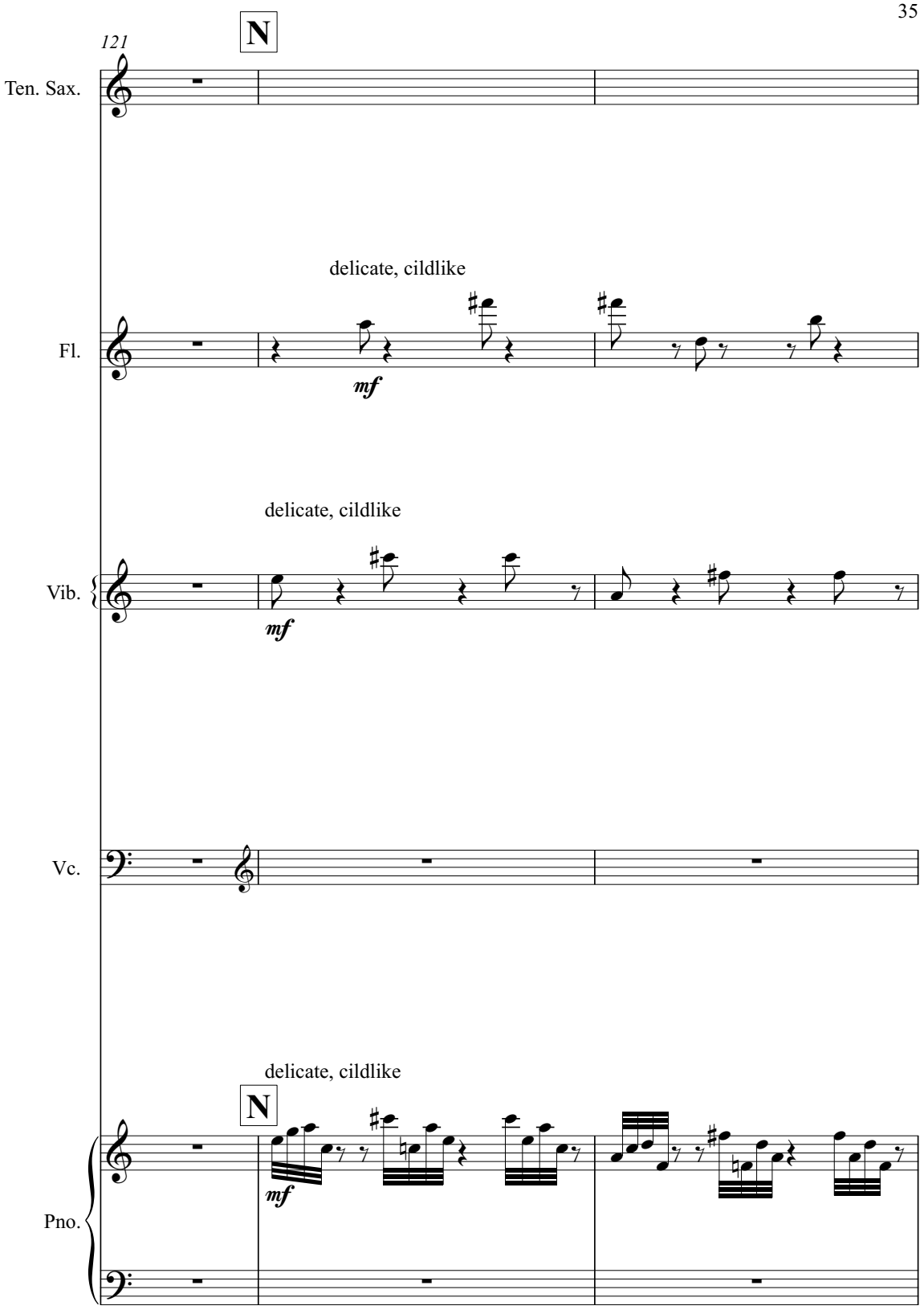
121
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Vib.
mf
Vc.
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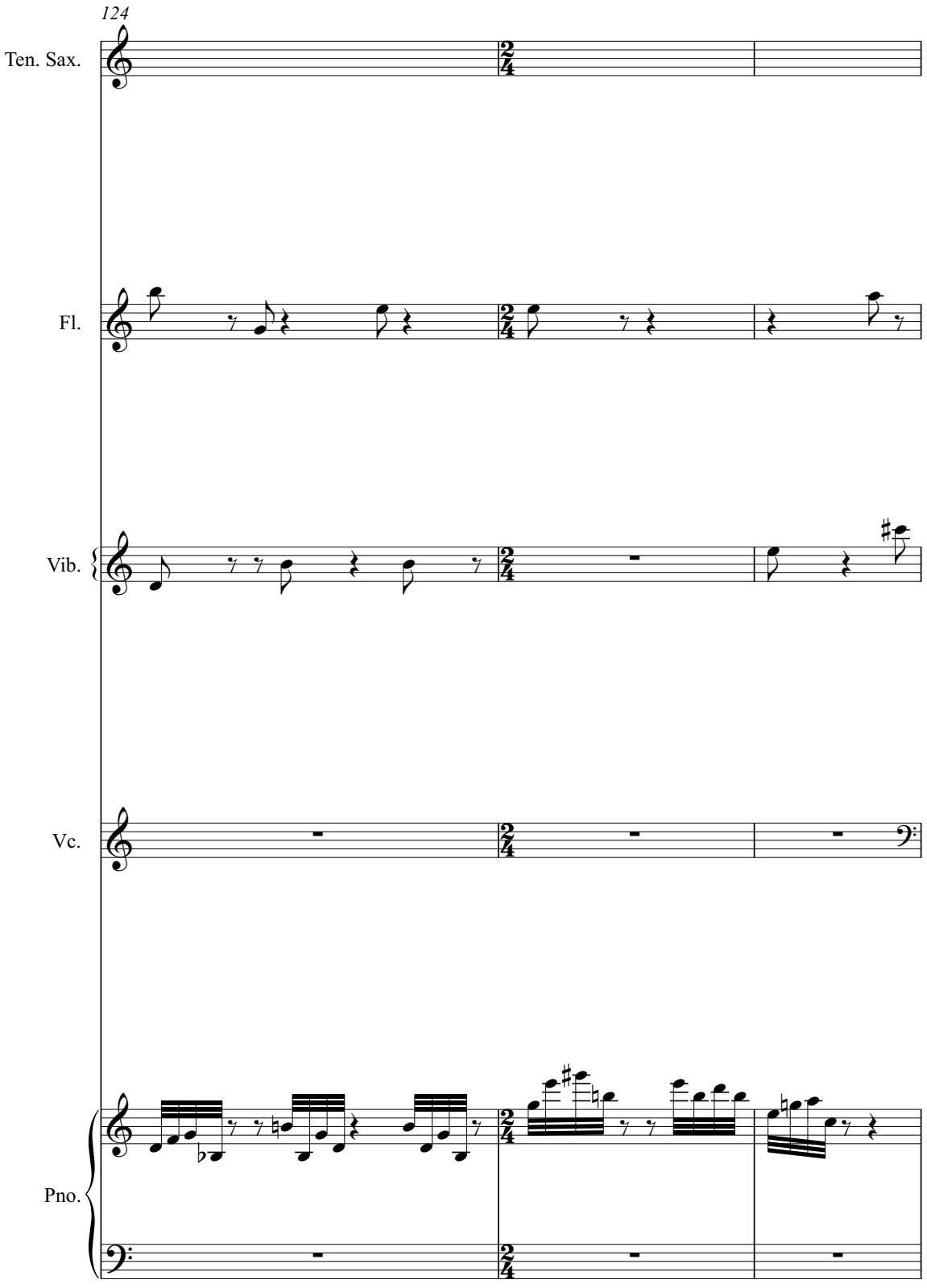
Pno.
mf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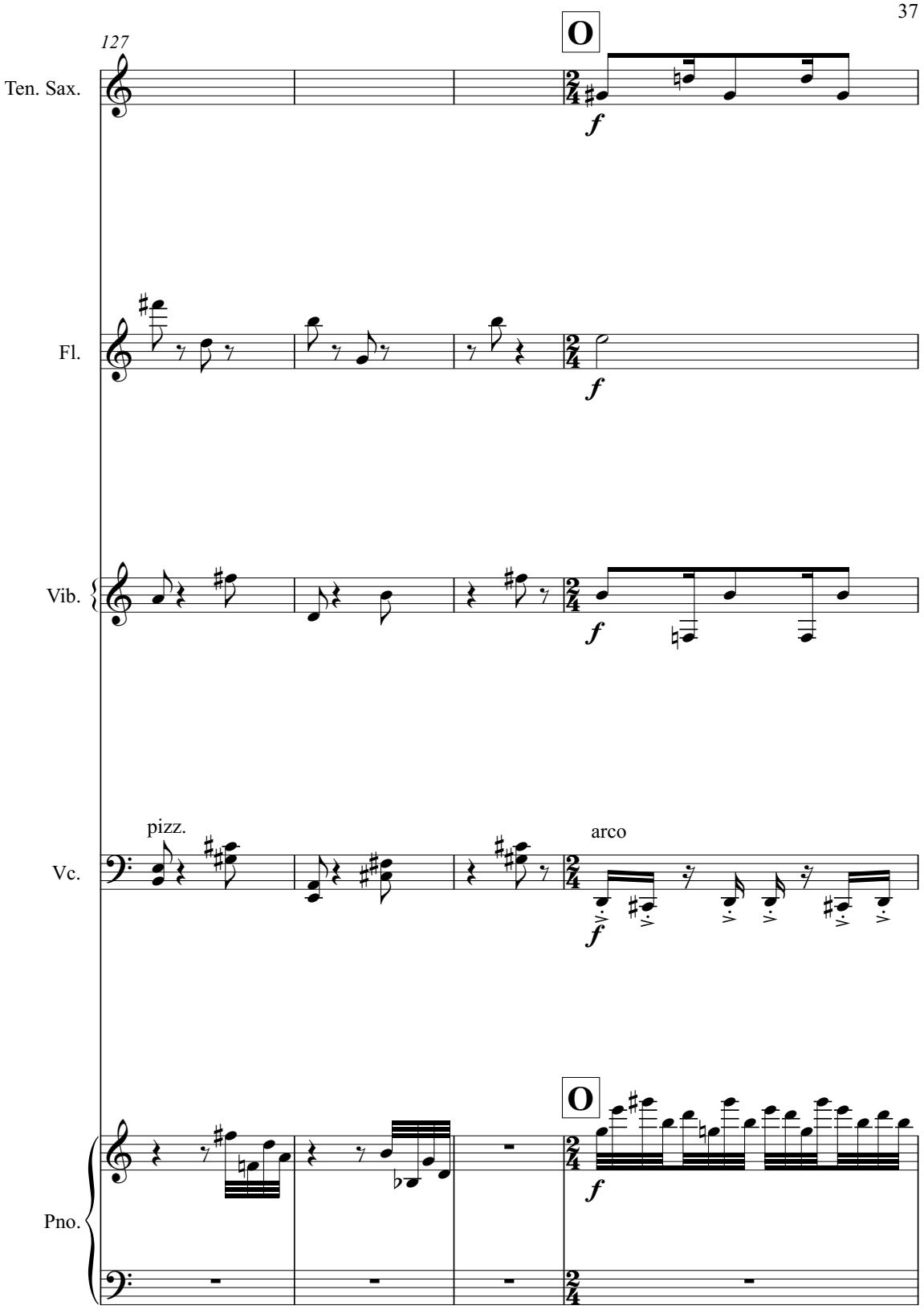
127
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arco
Vc.
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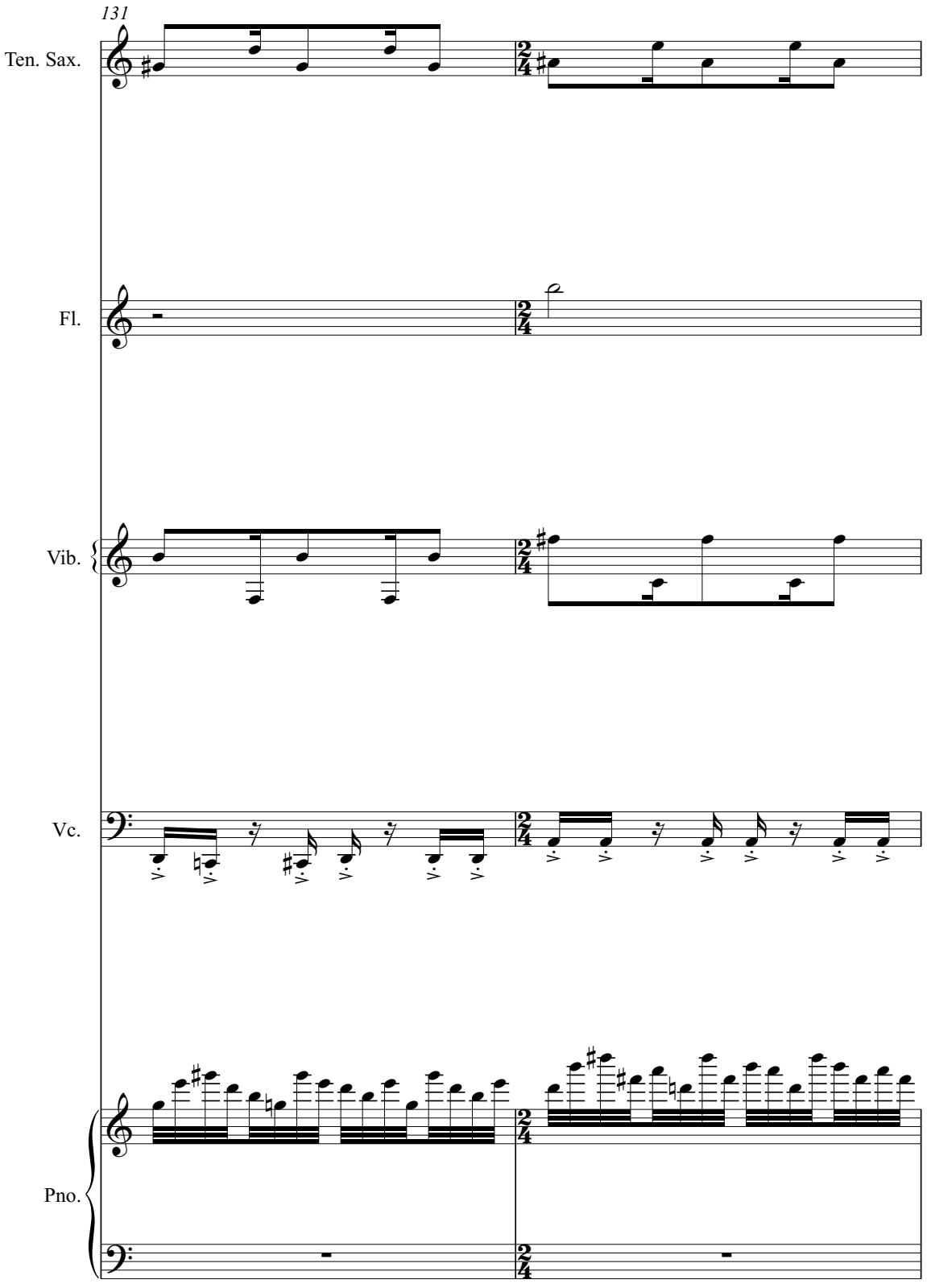
O
Pno.
f


131
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Vc.
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133
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135
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legato might not be possible??
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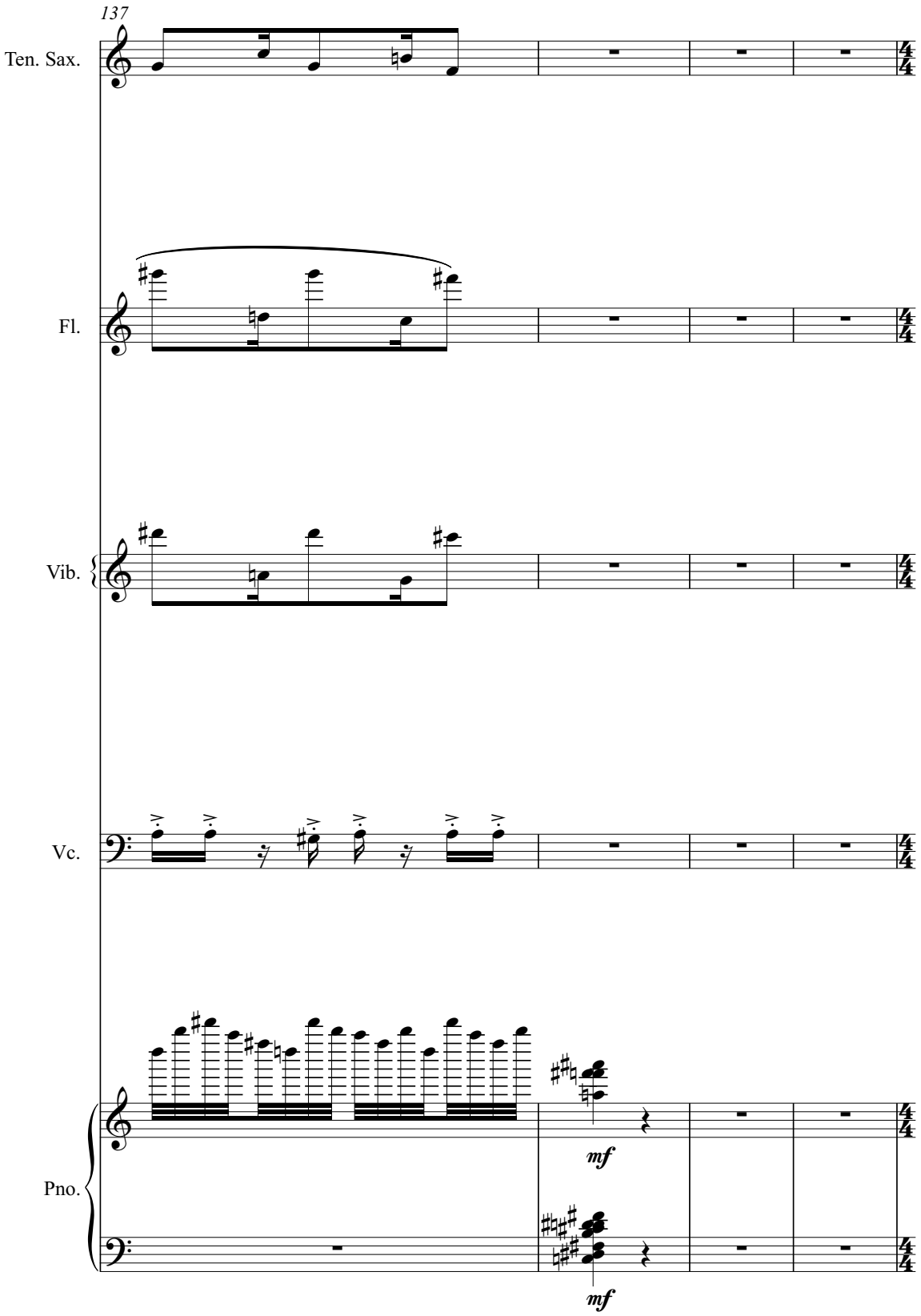
Pno.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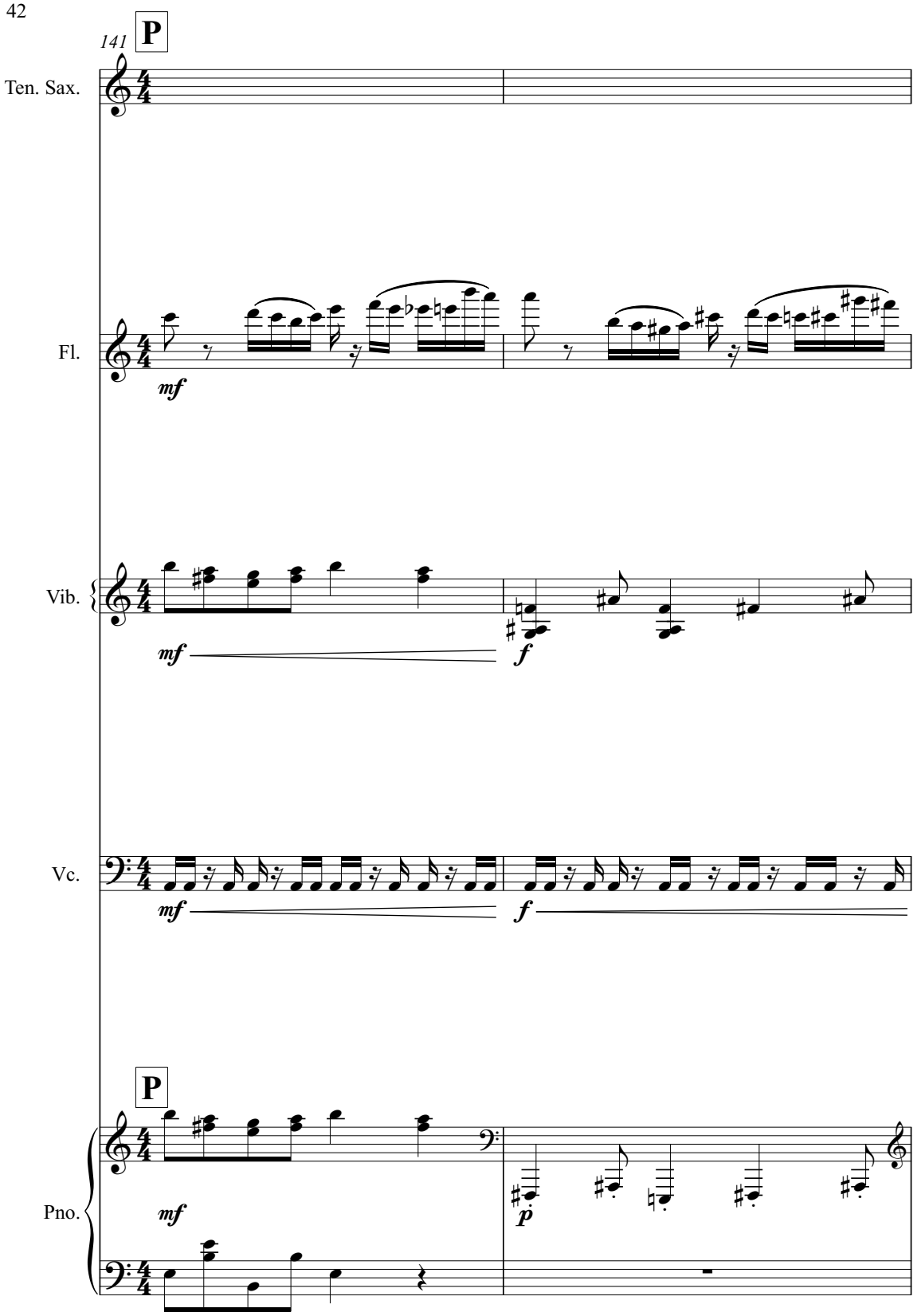
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P
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mf
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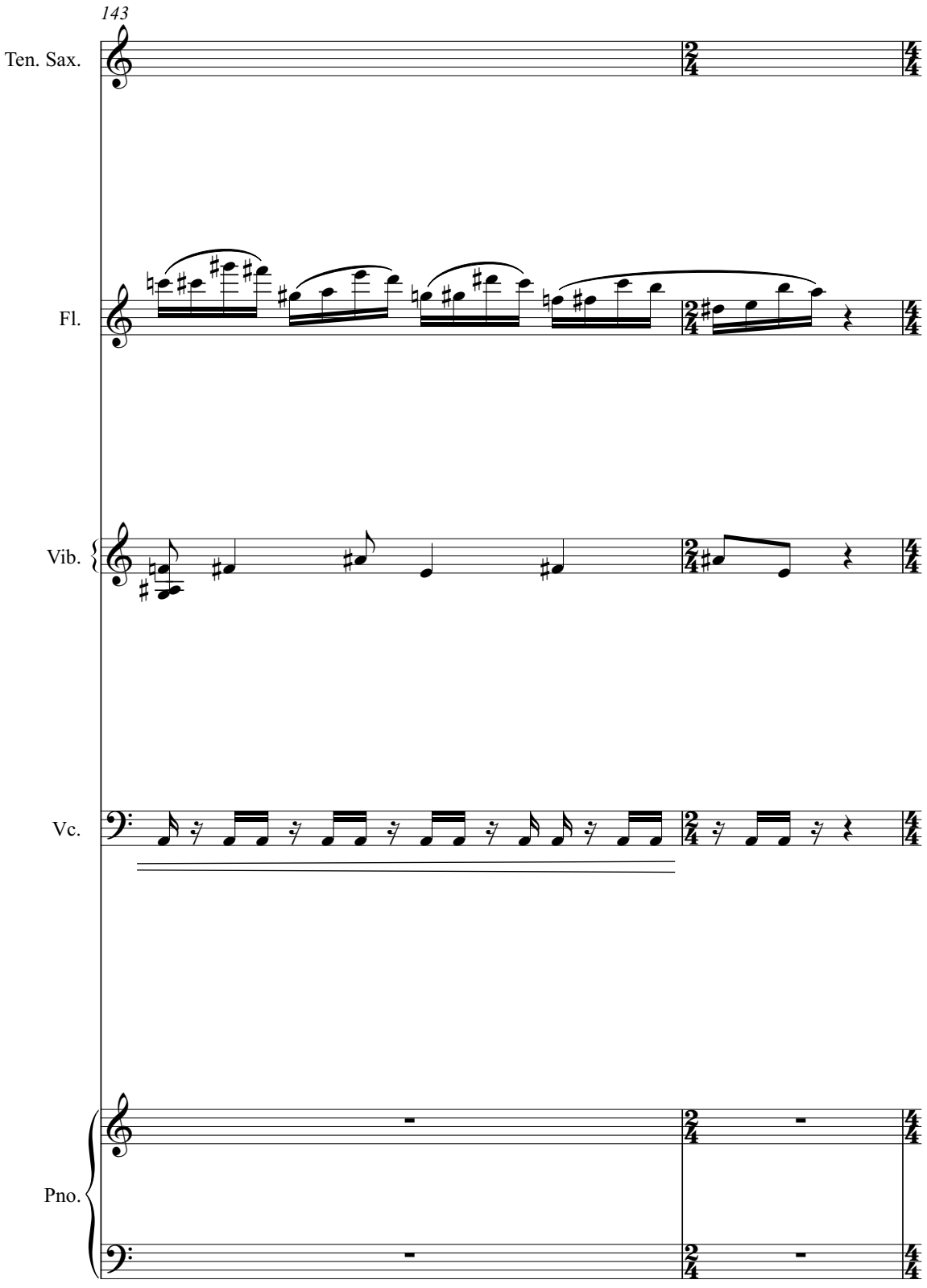
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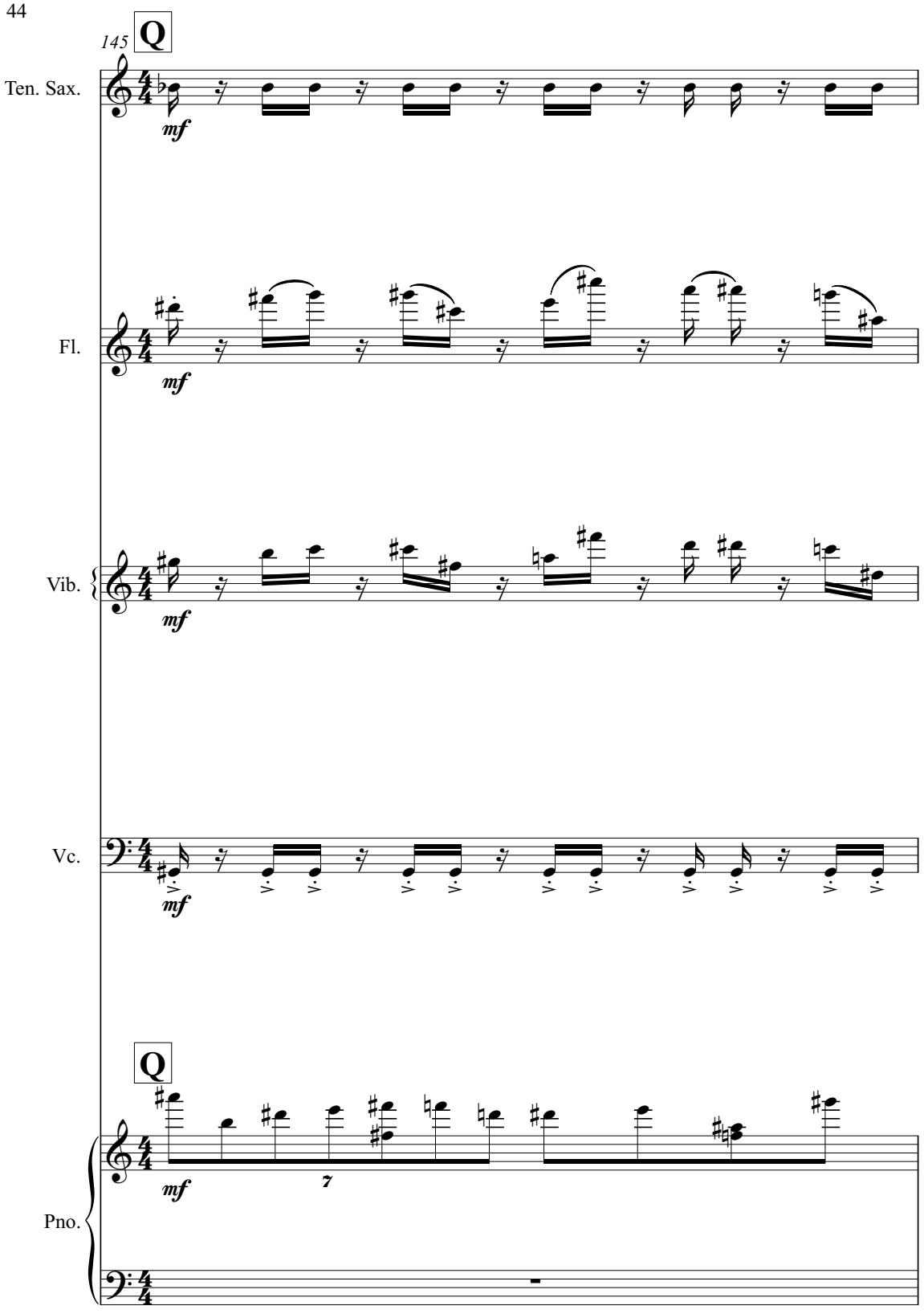
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mf
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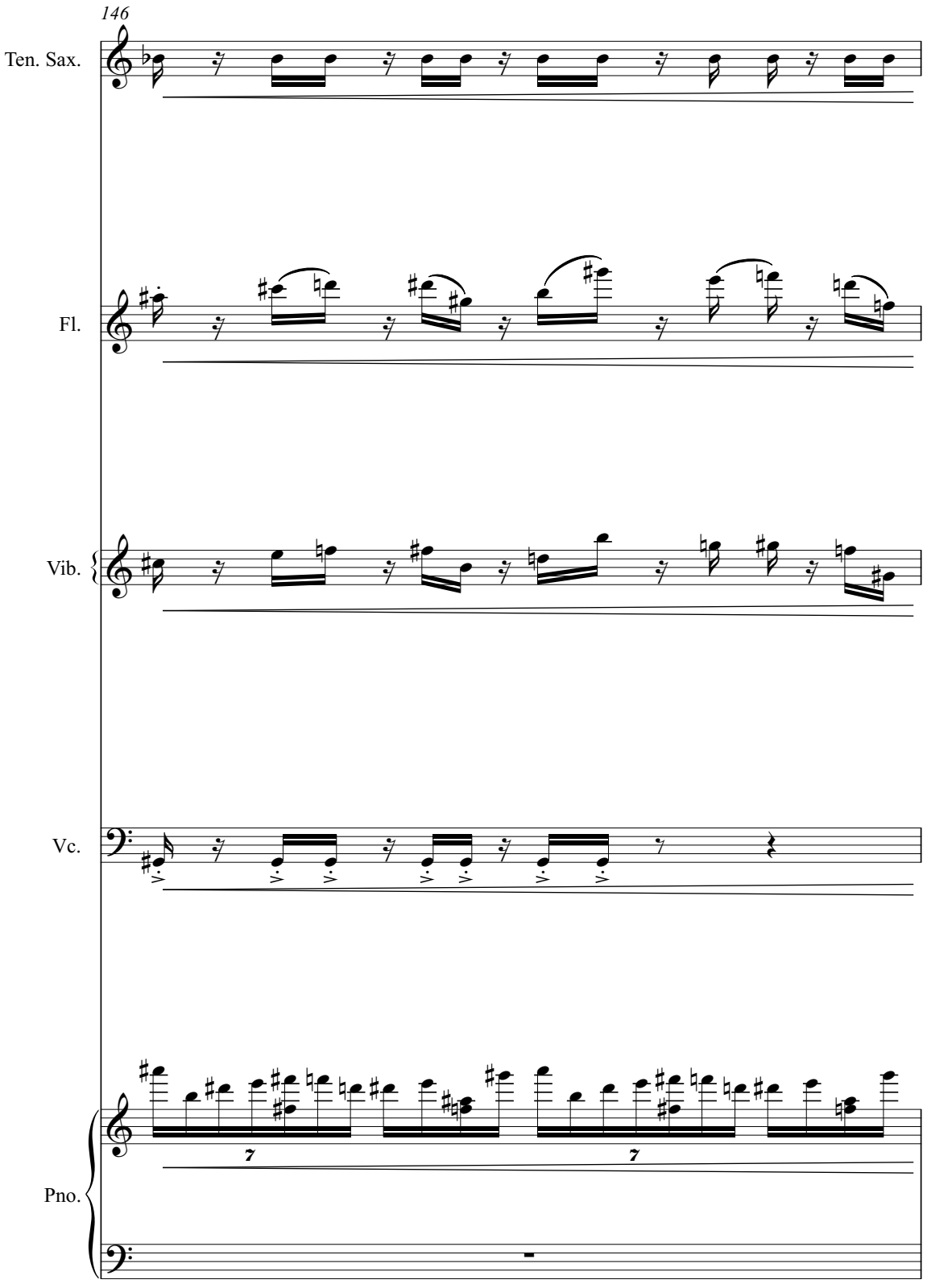
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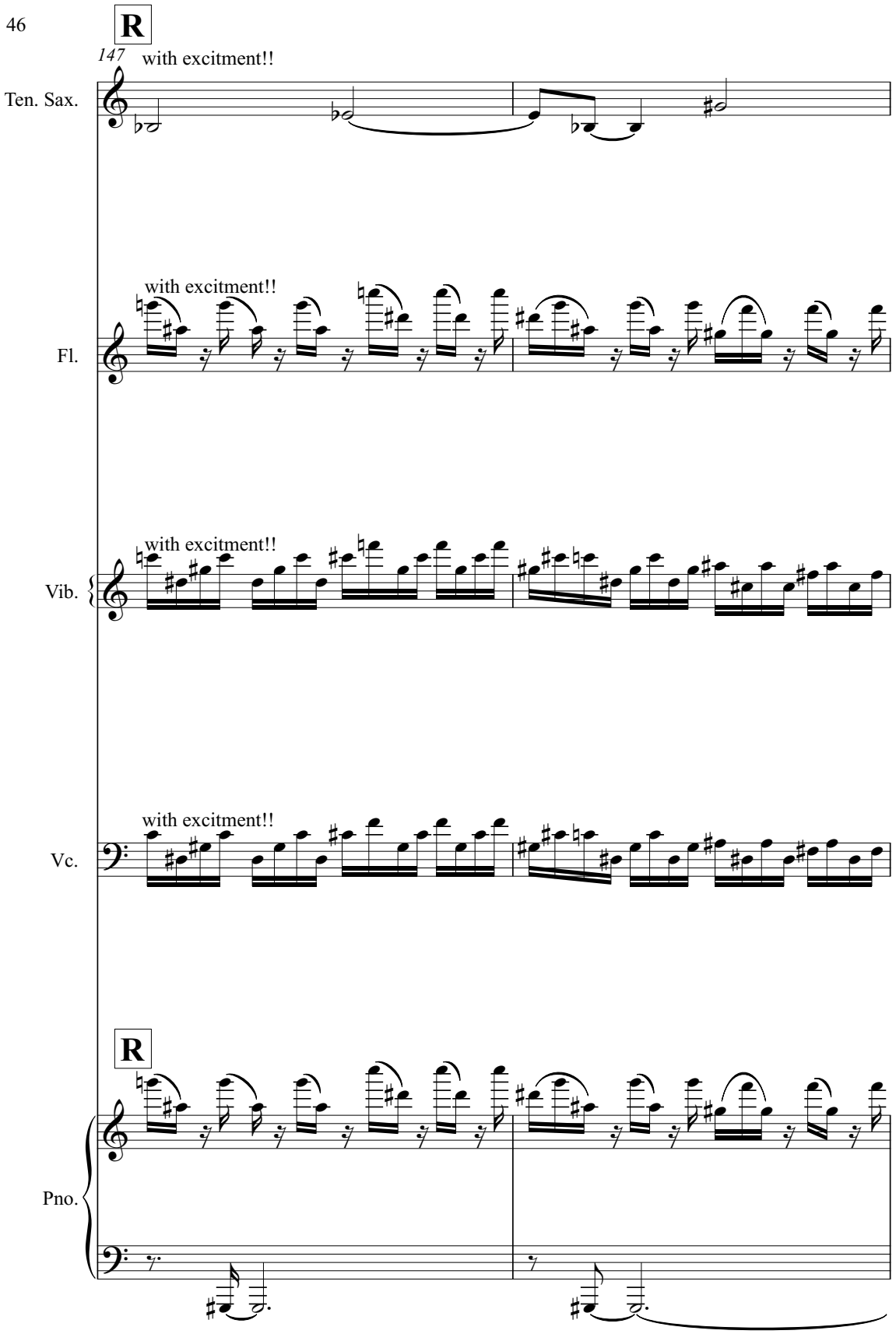
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147
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with excitment!!
Vc.
R
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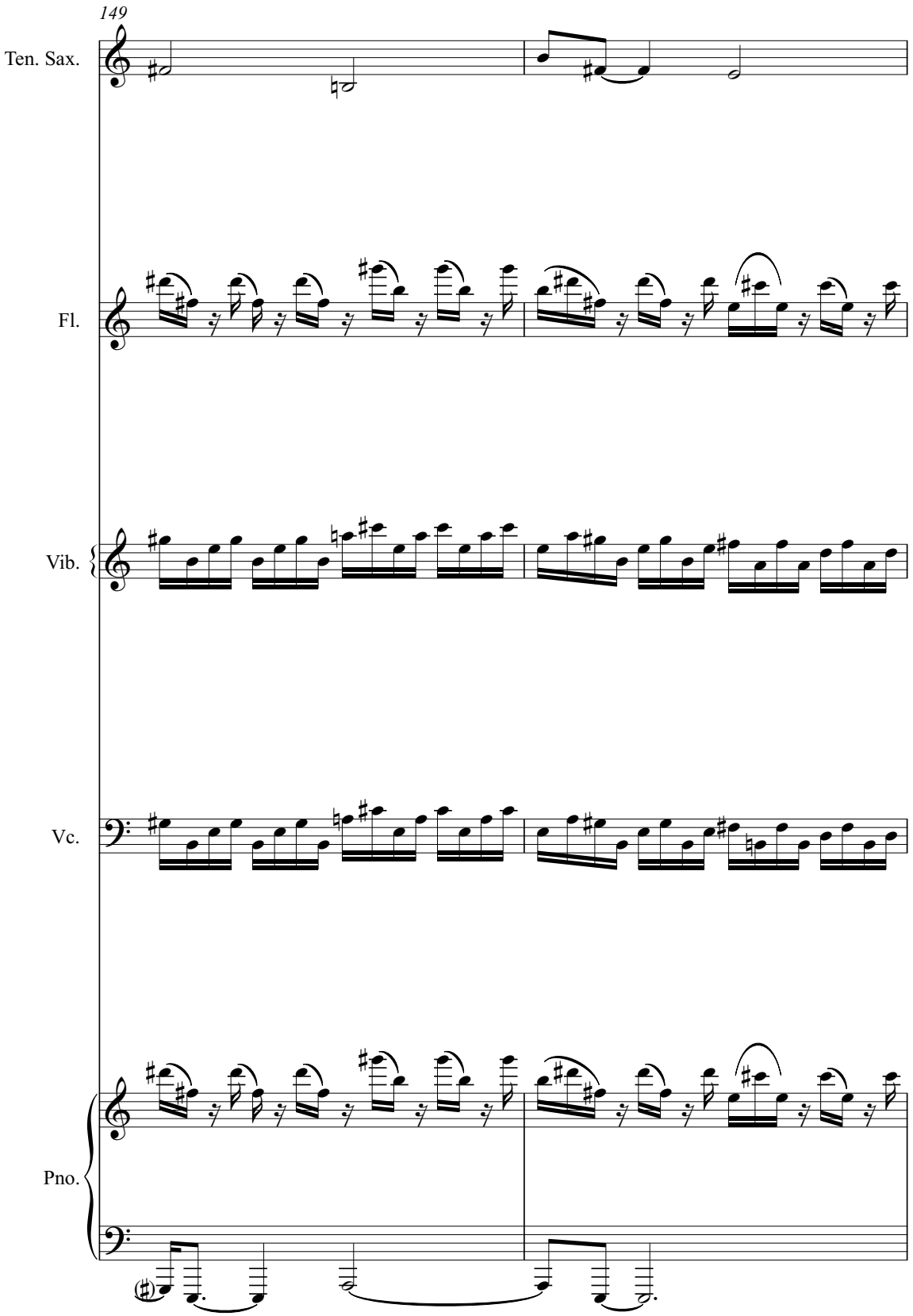
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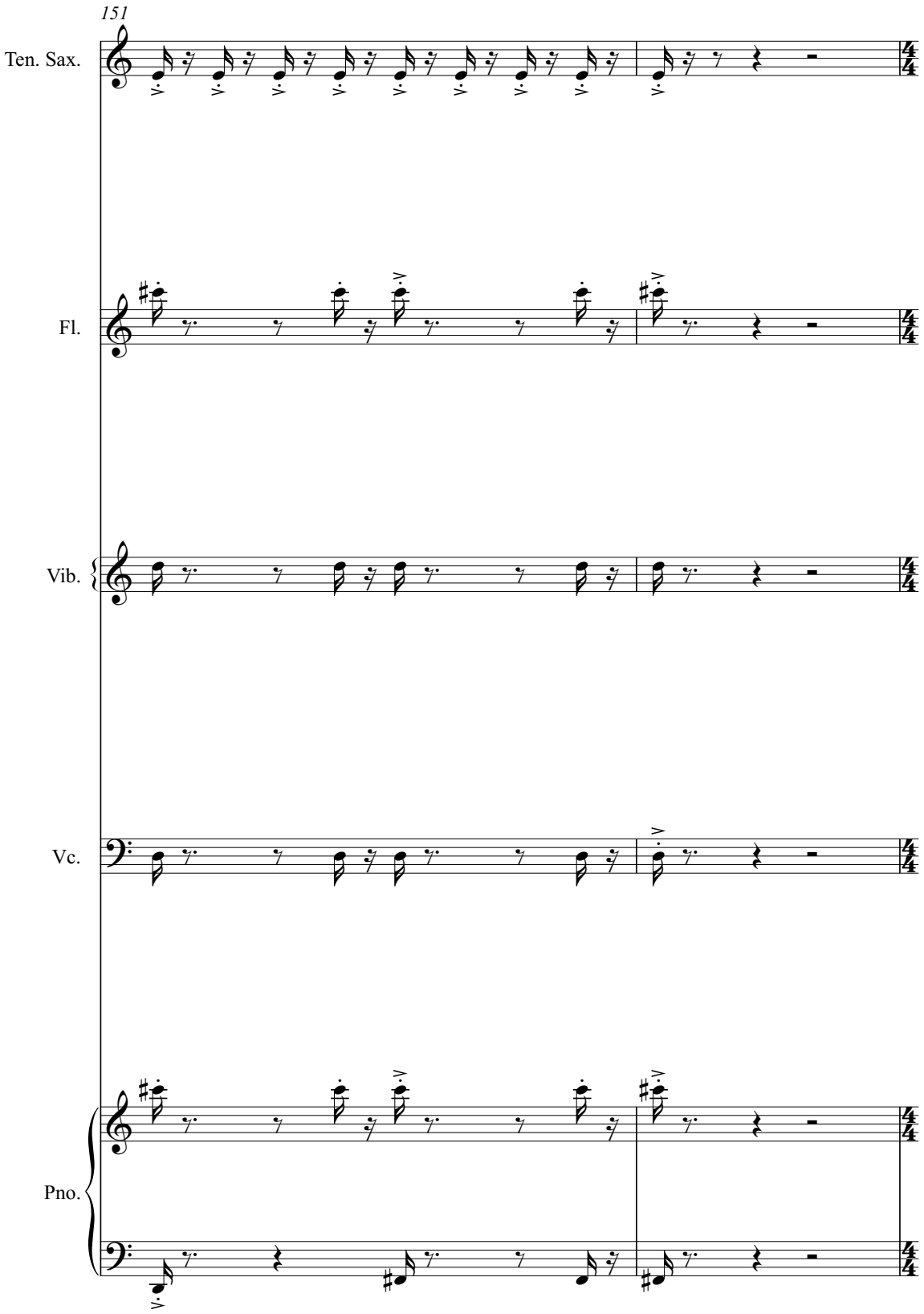
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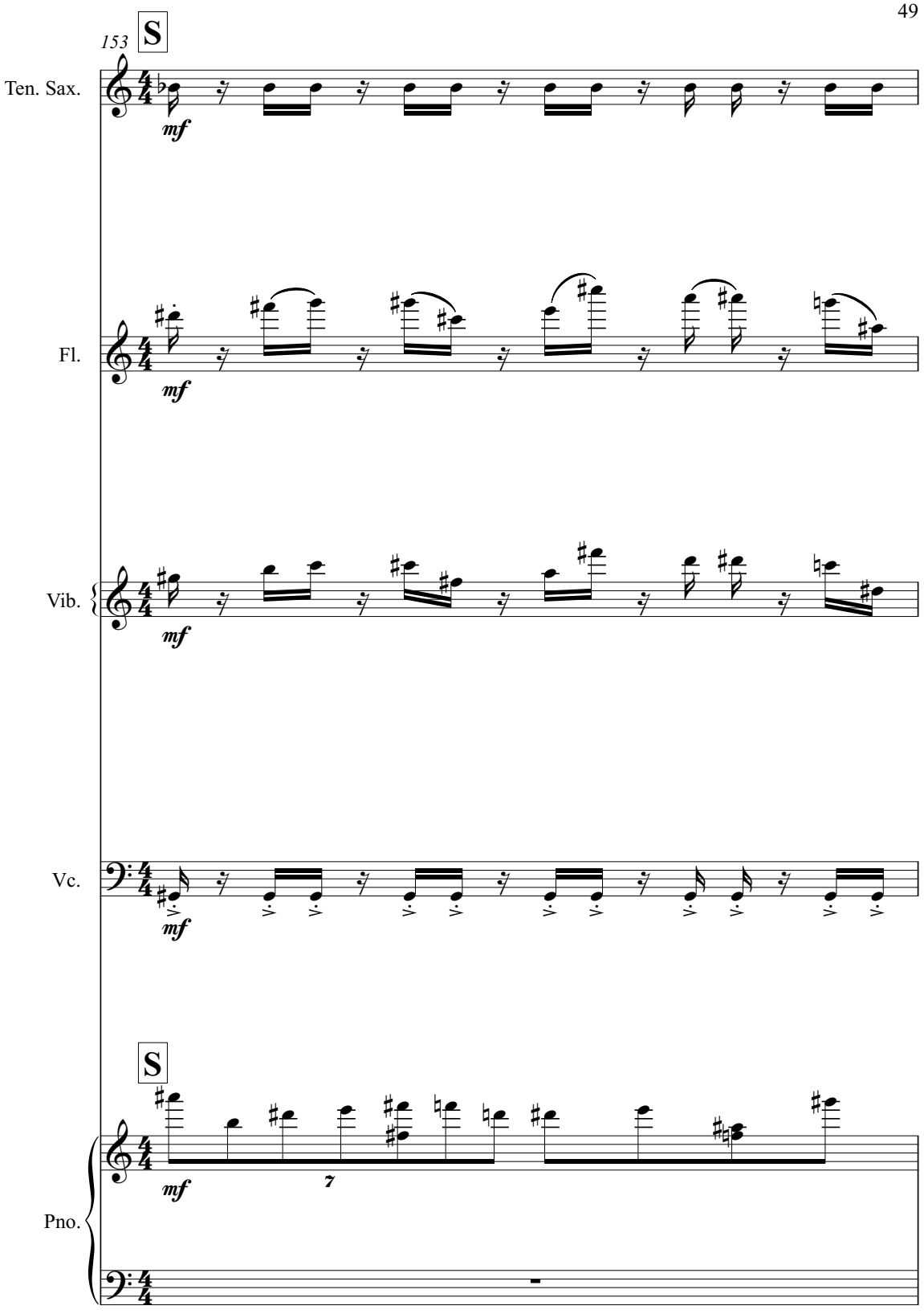
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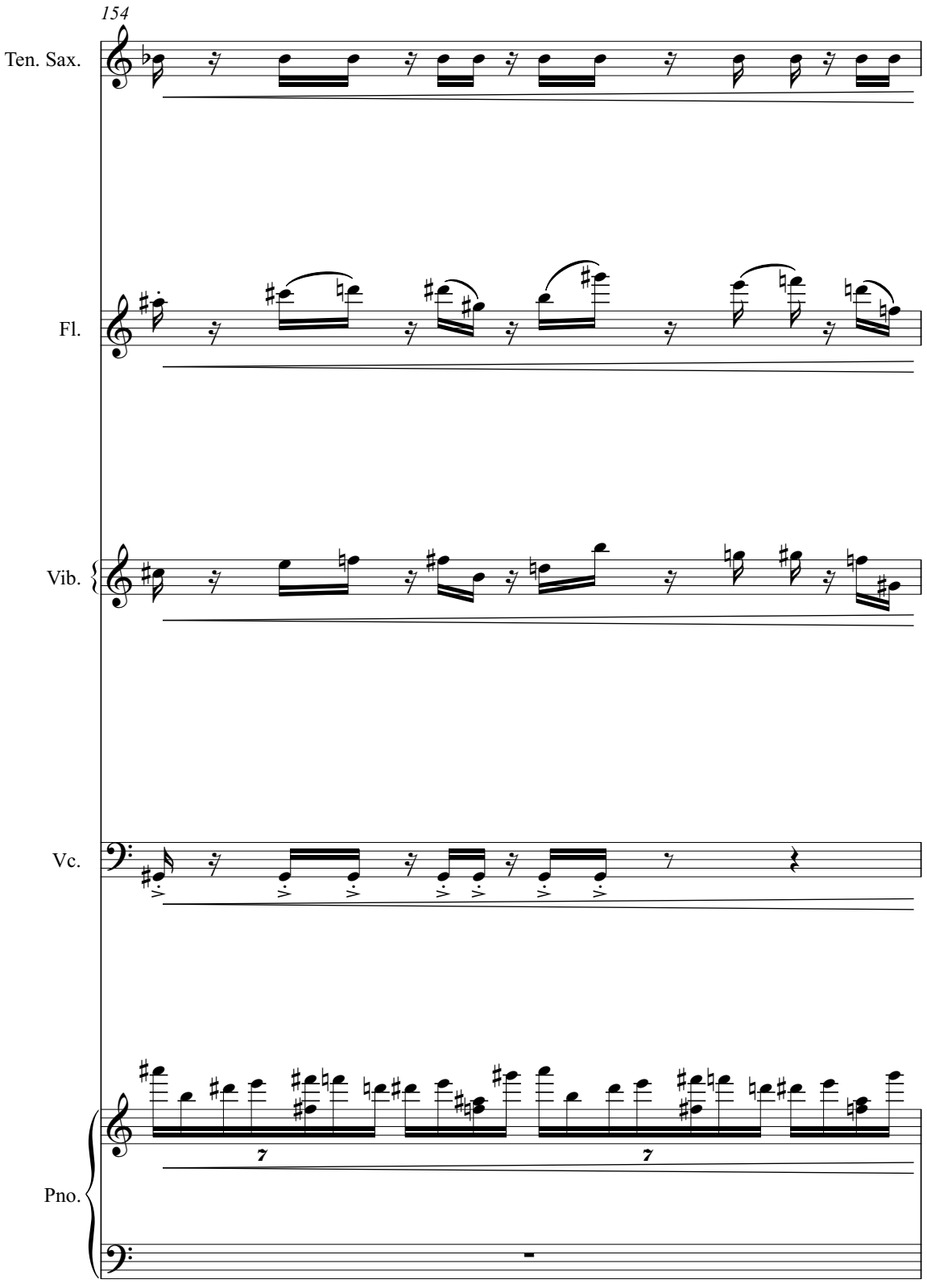
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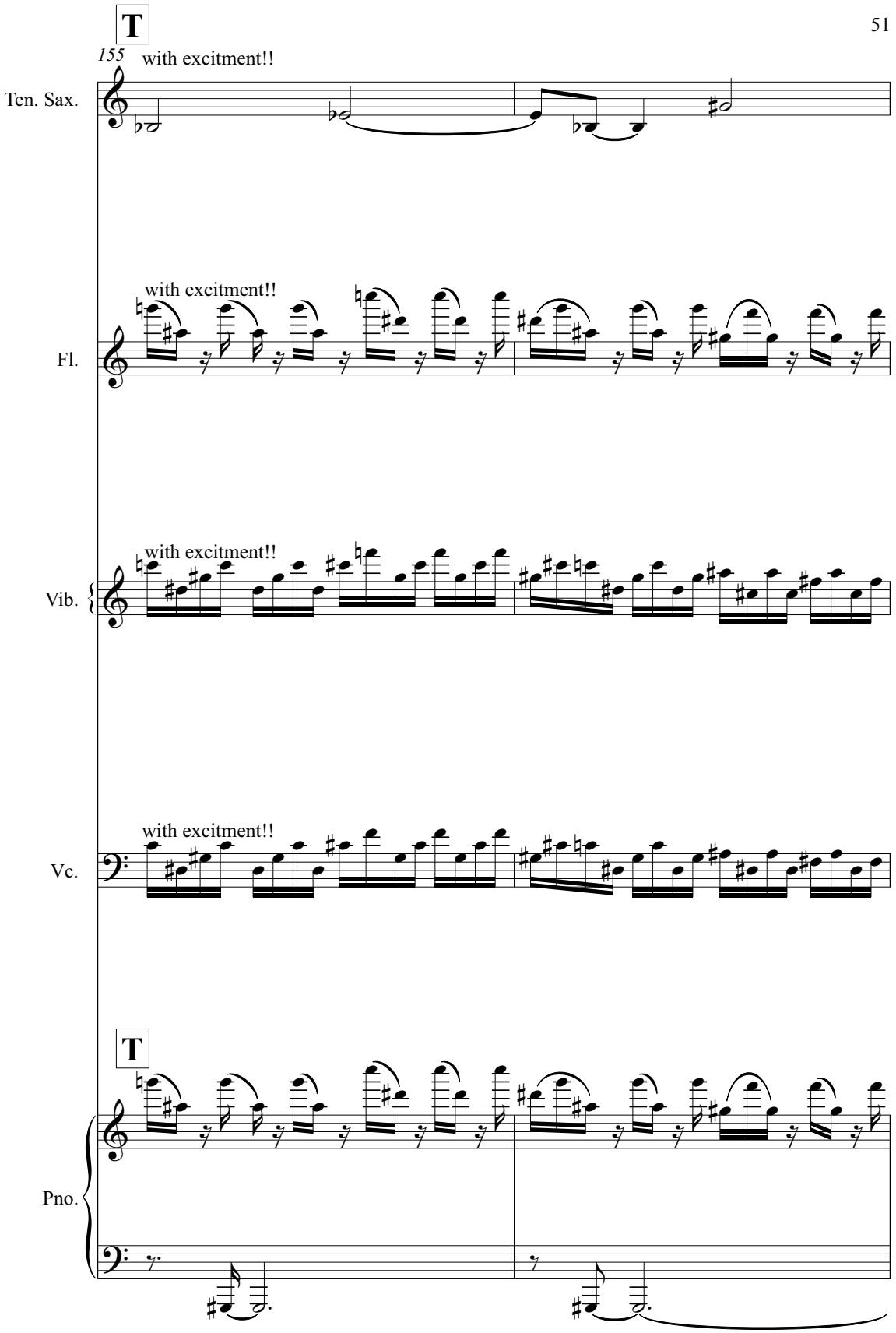
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155
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Ten. Sax.
with excitment!!
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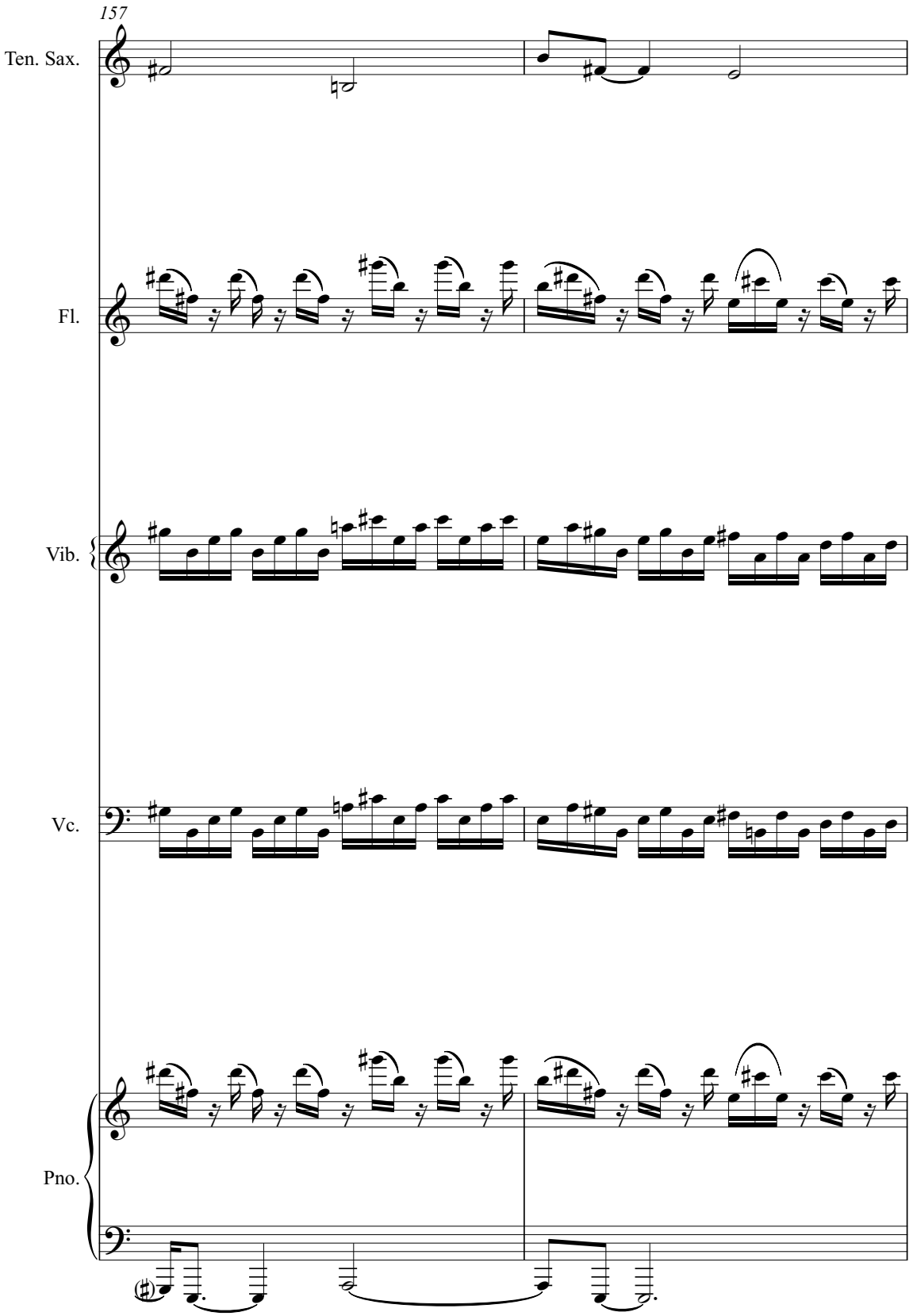
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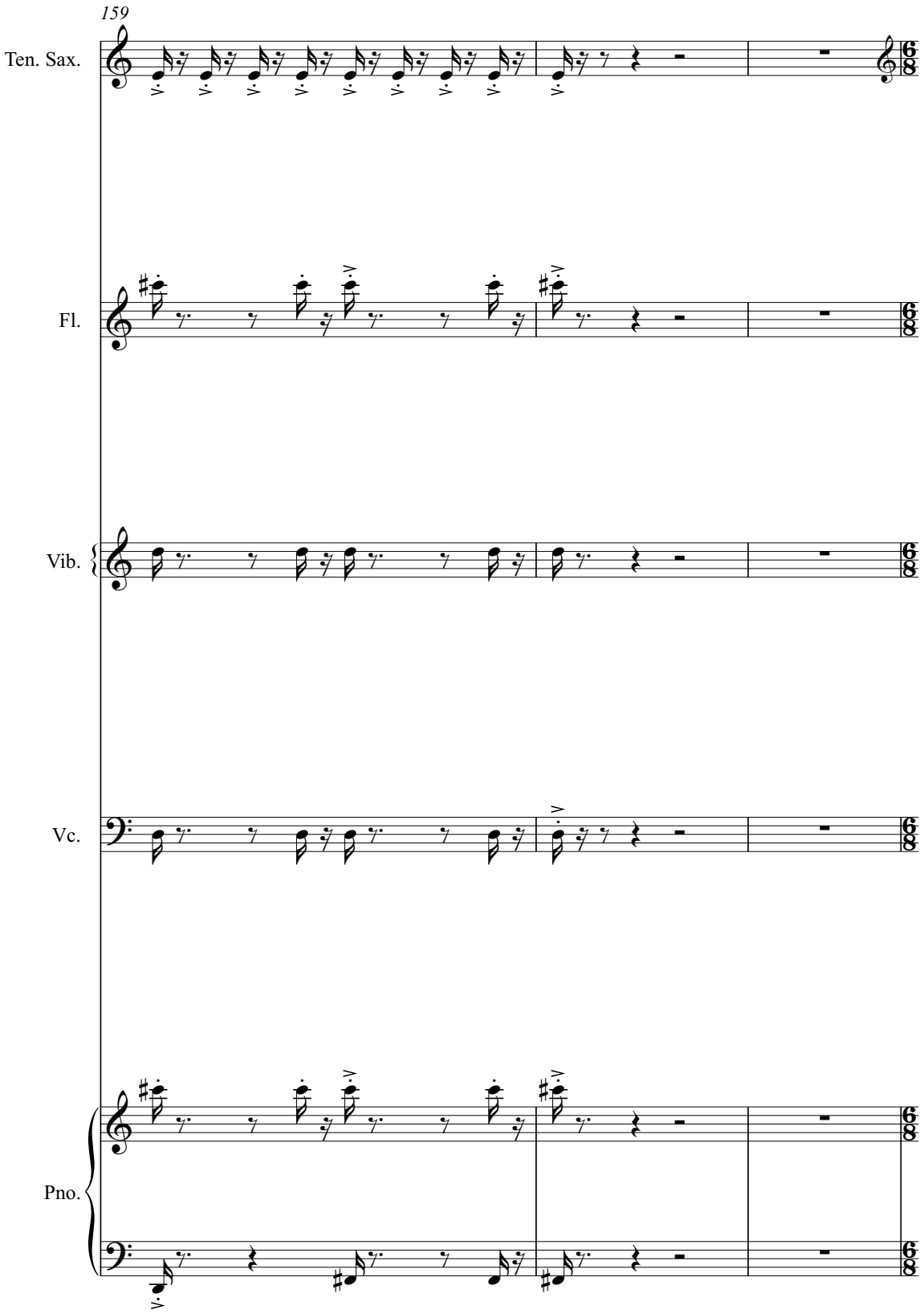
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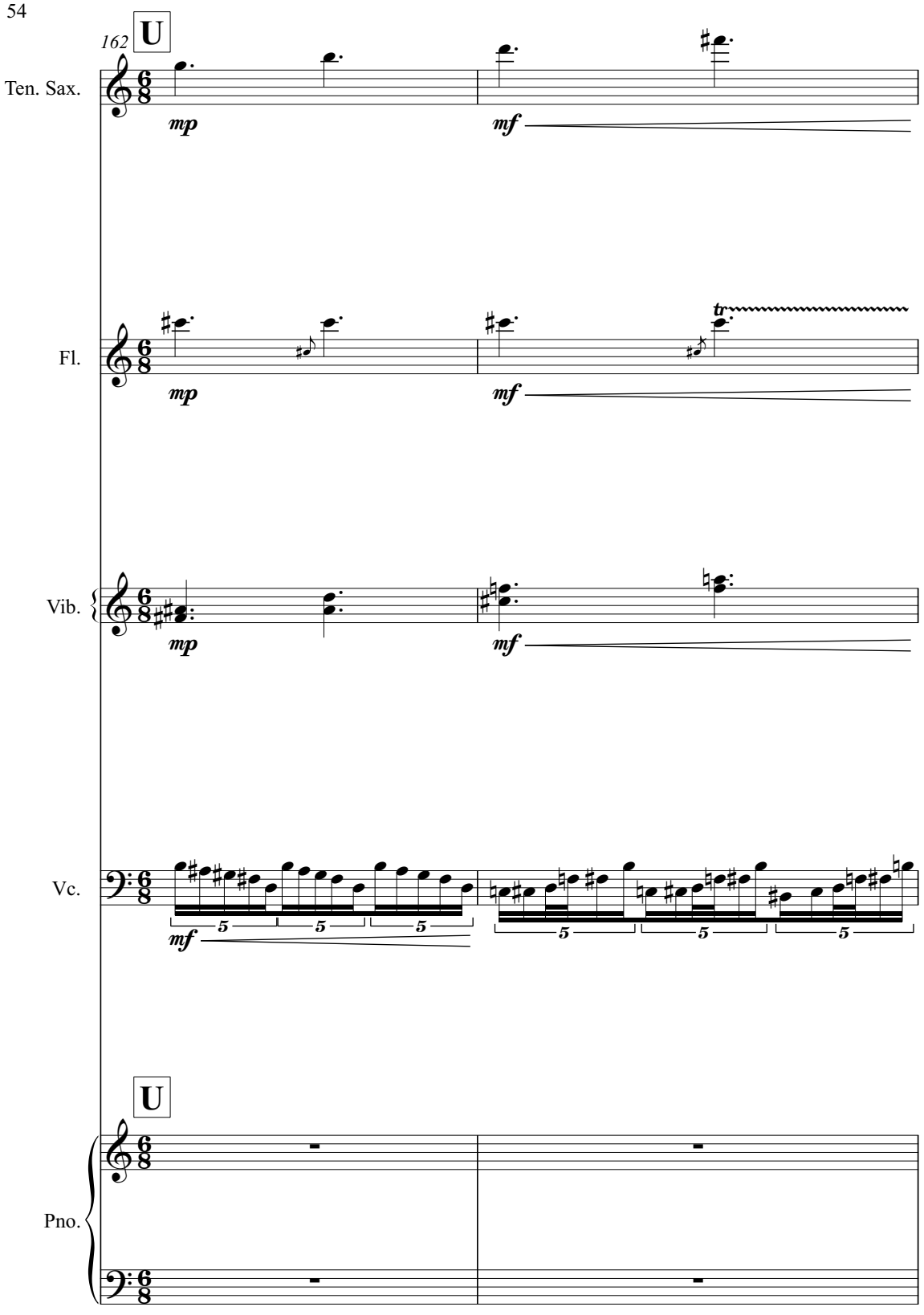
162
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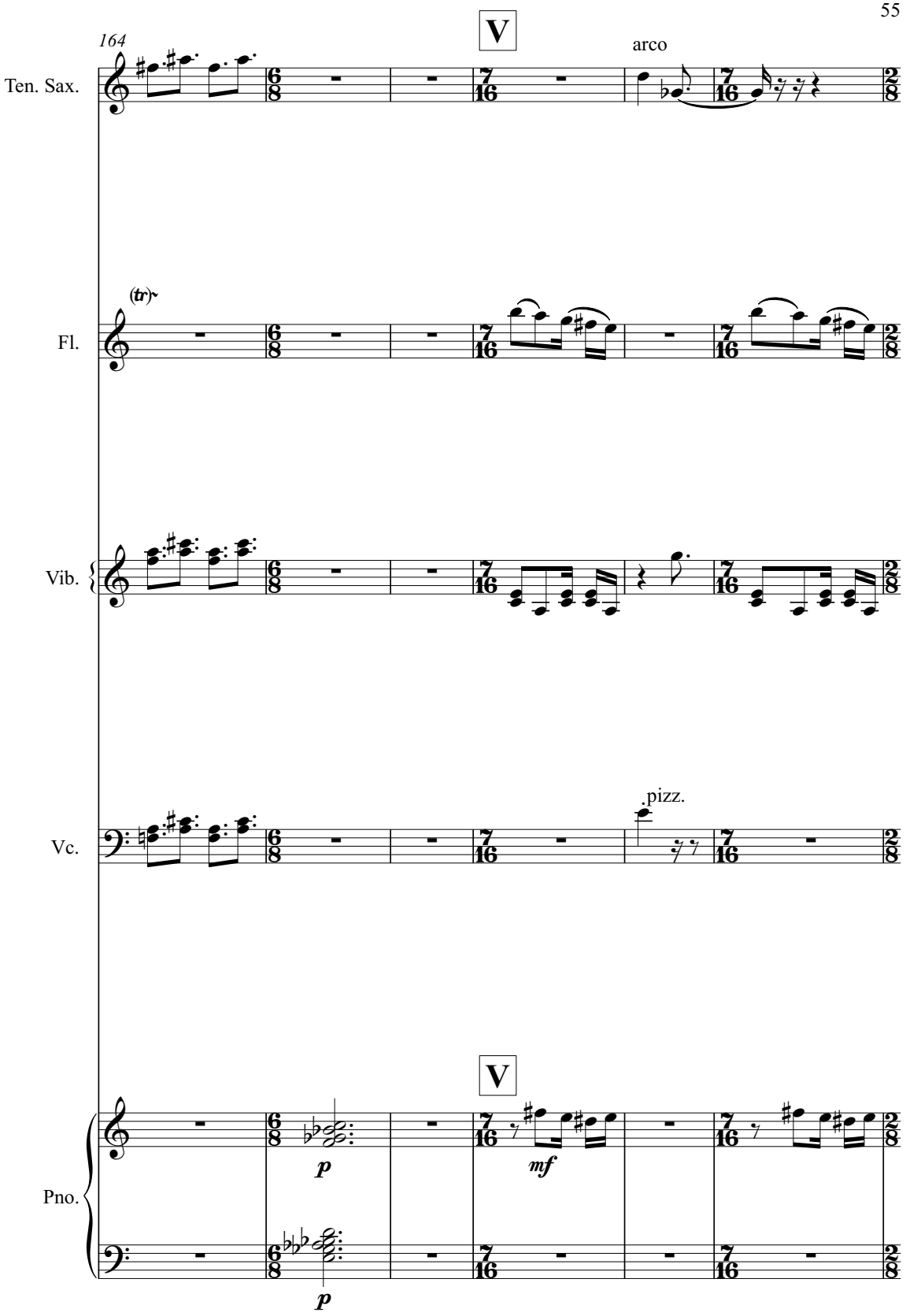
164
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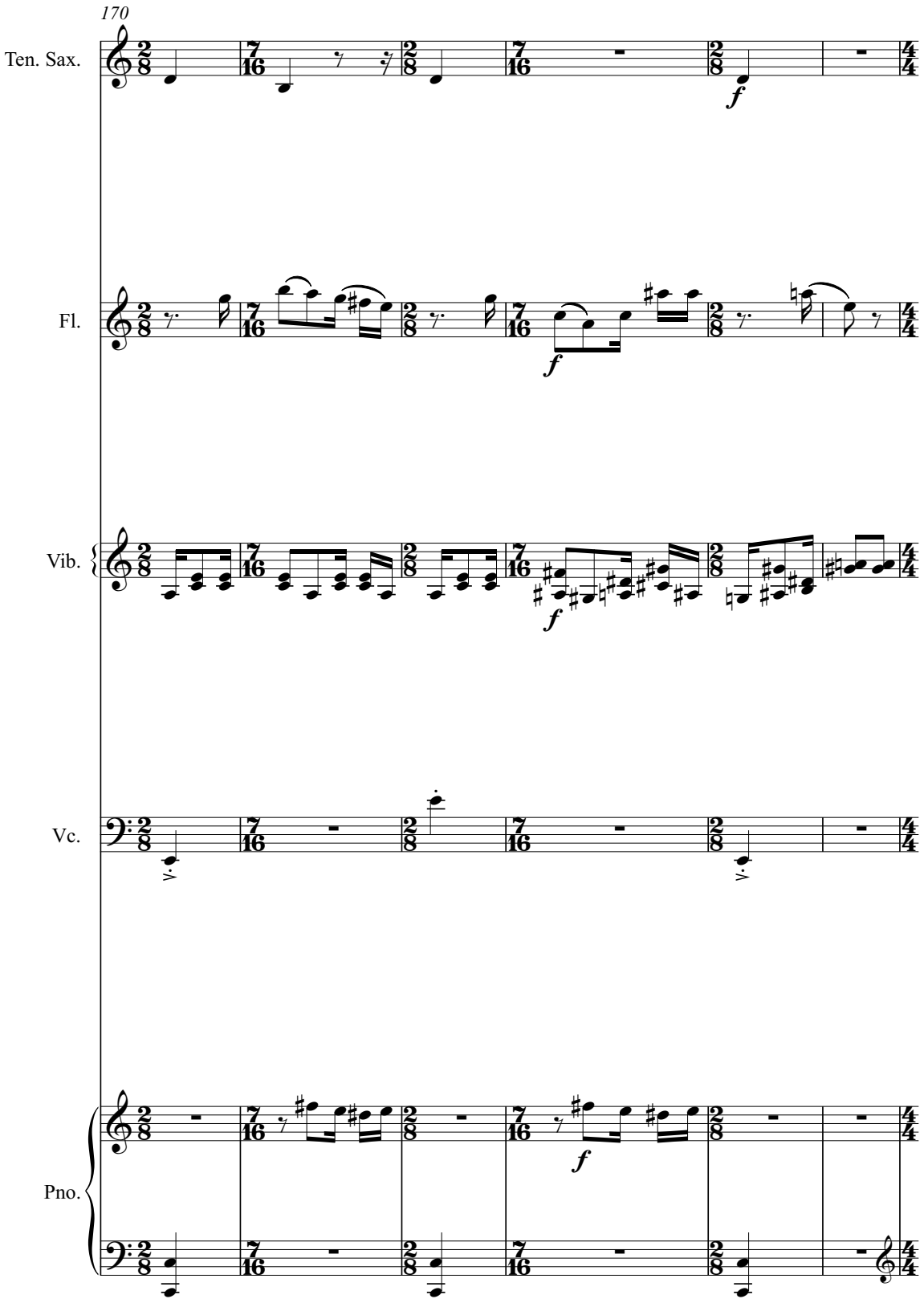
170
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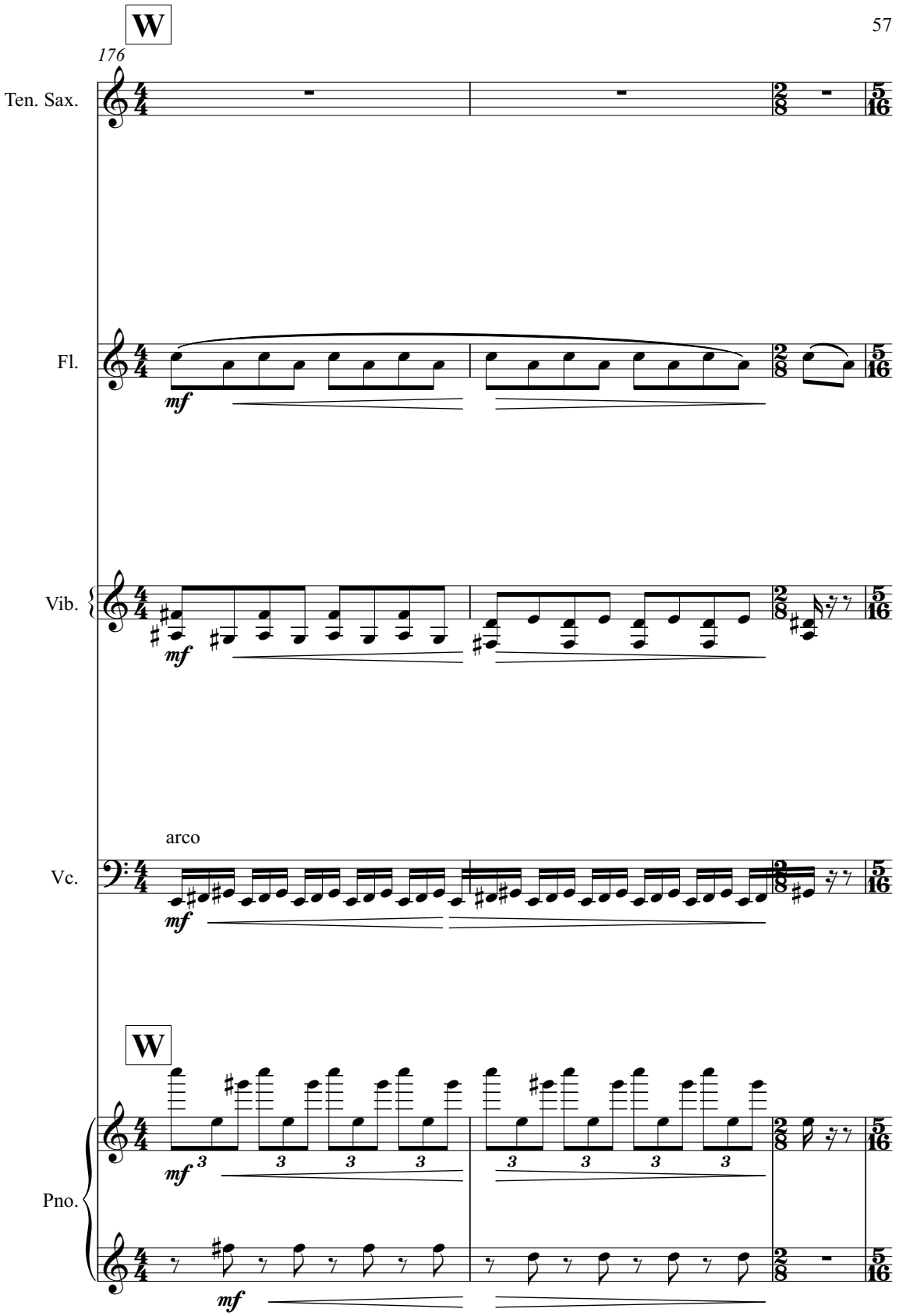
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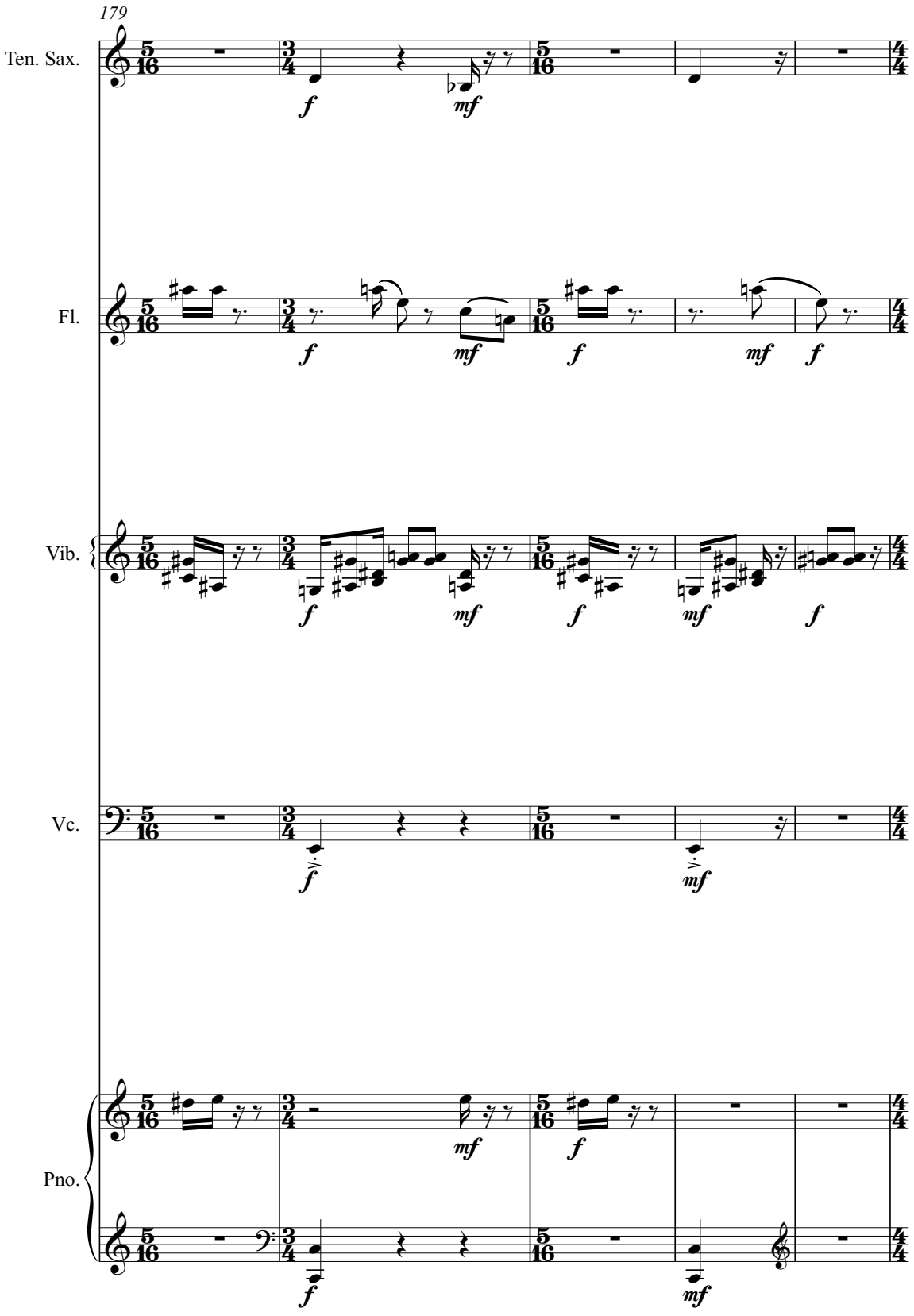
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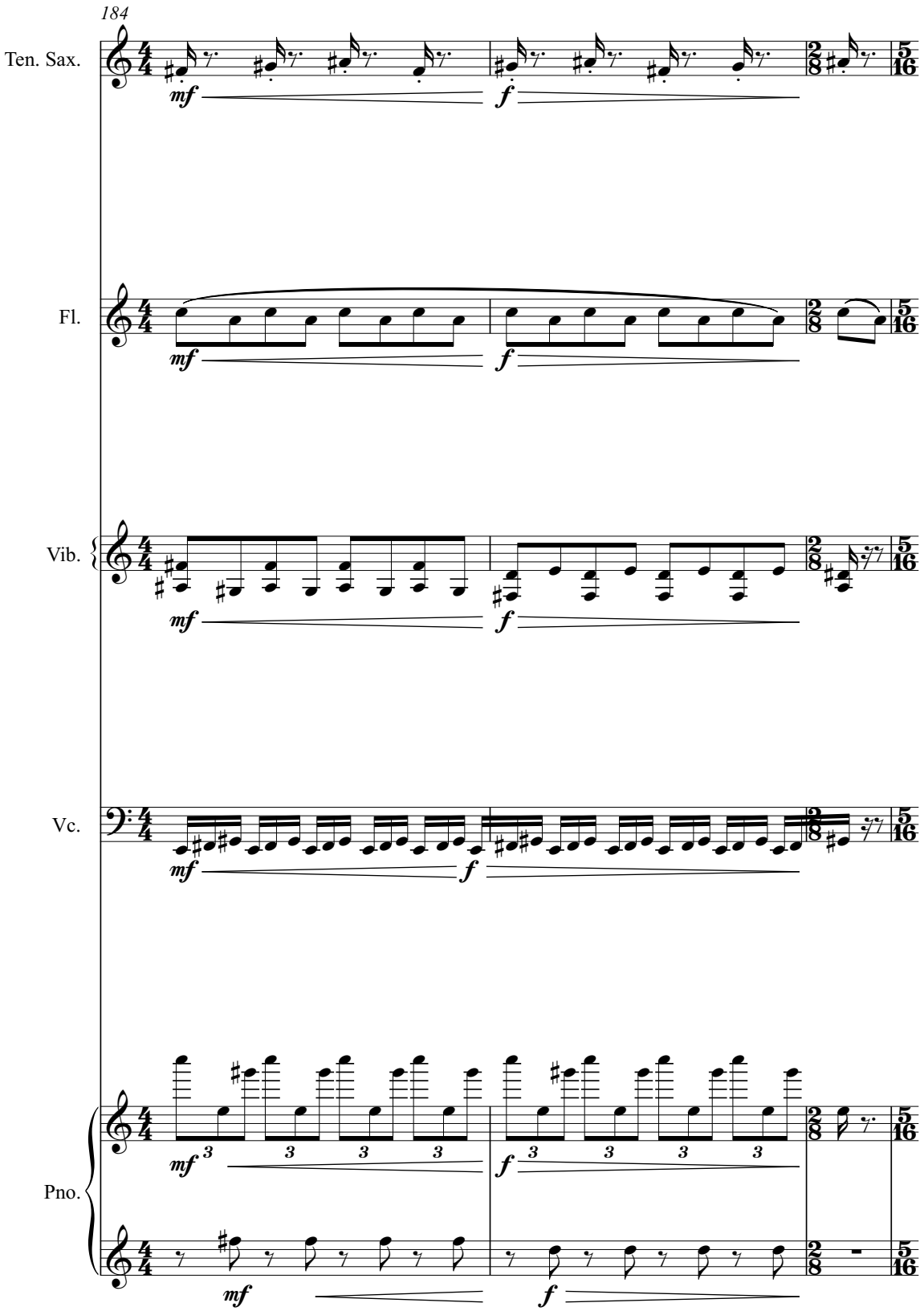
184
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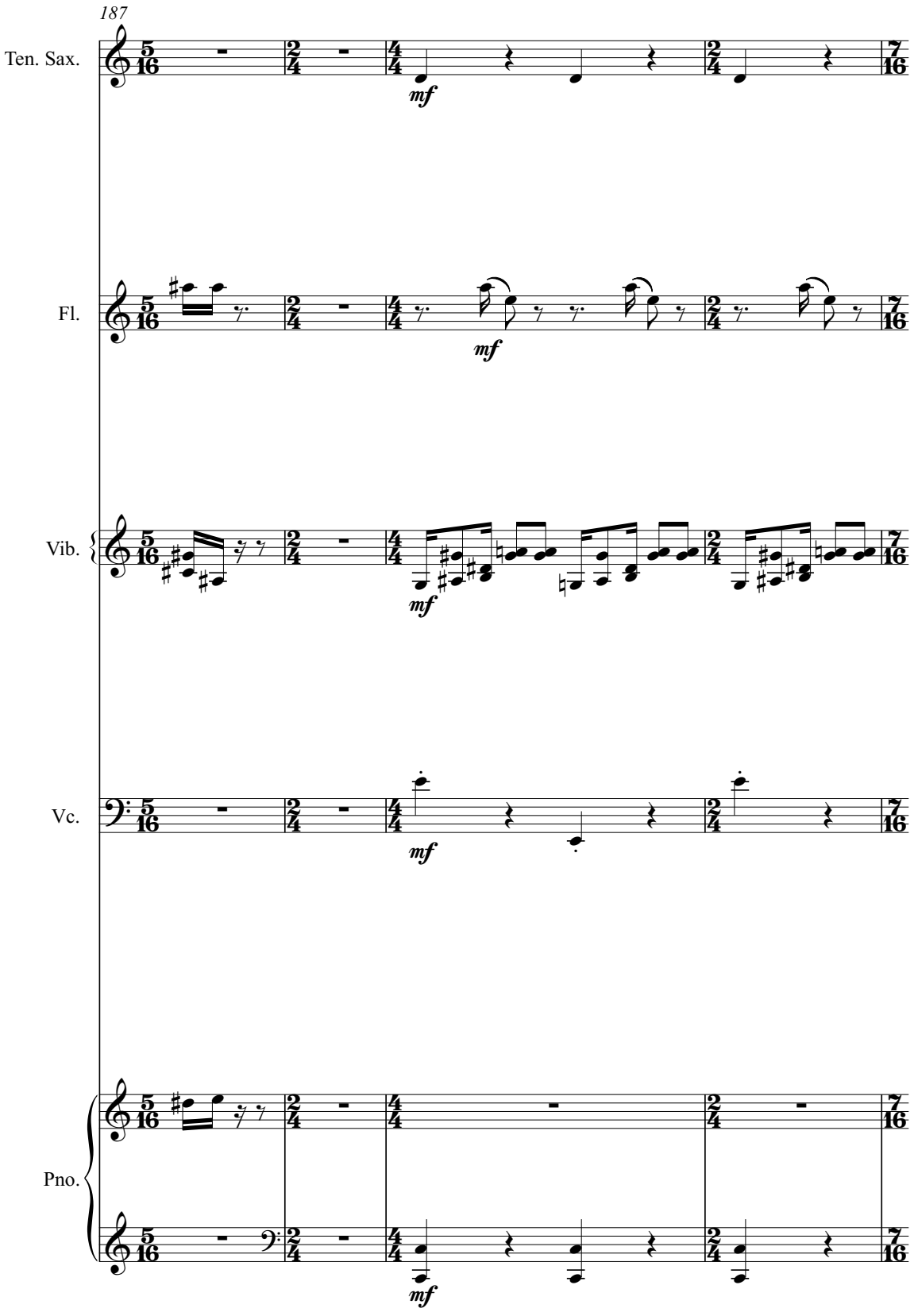
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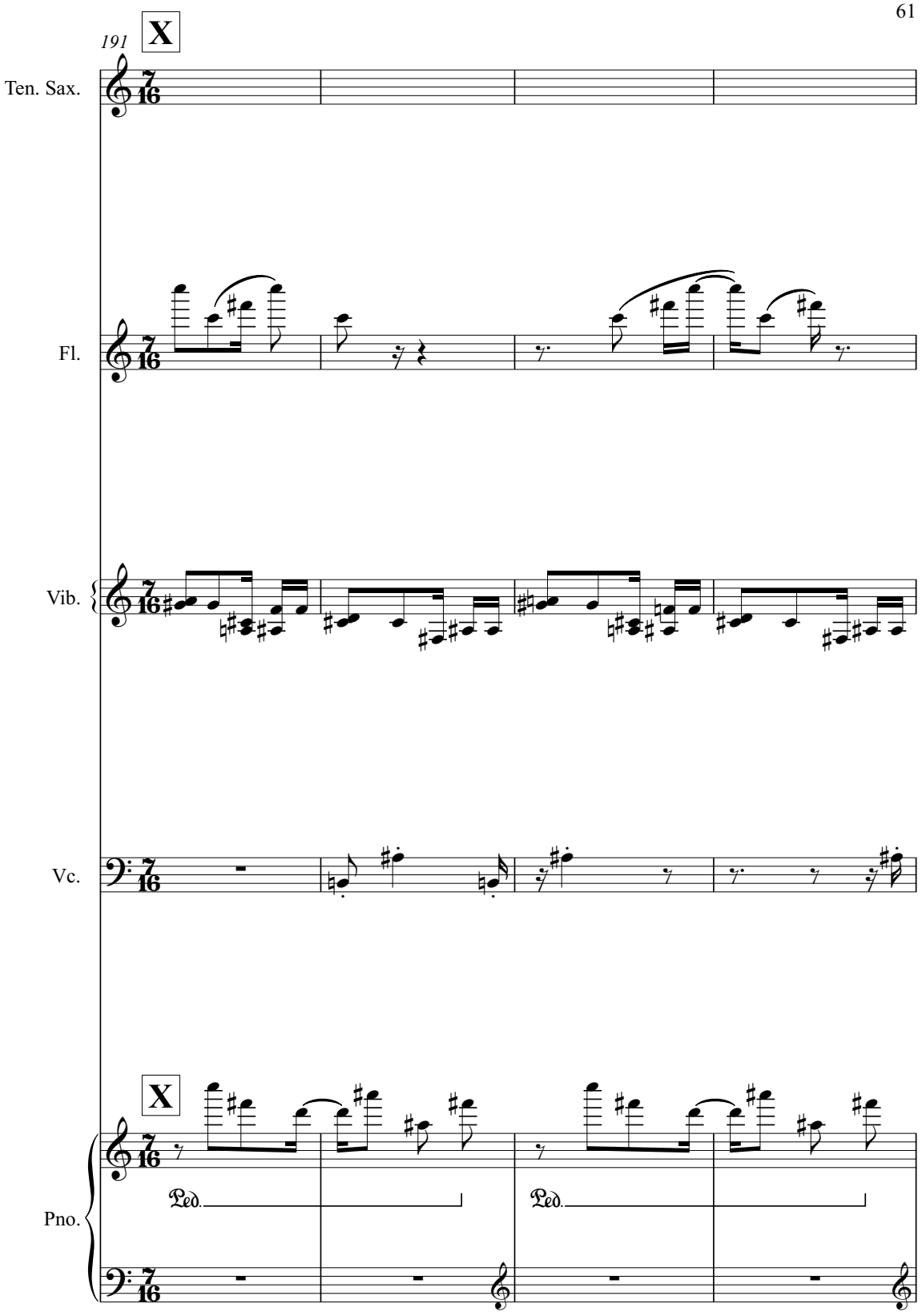
191
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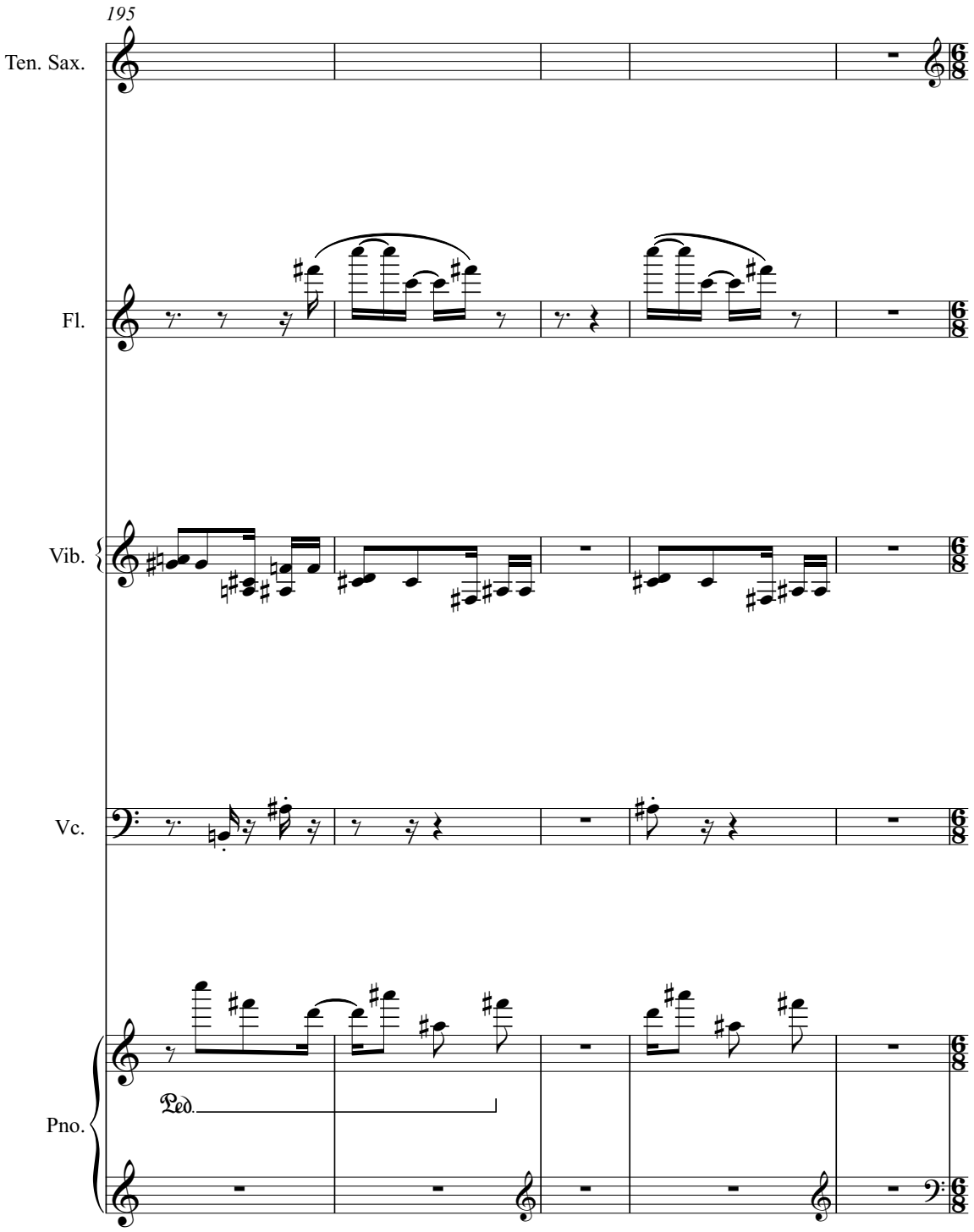
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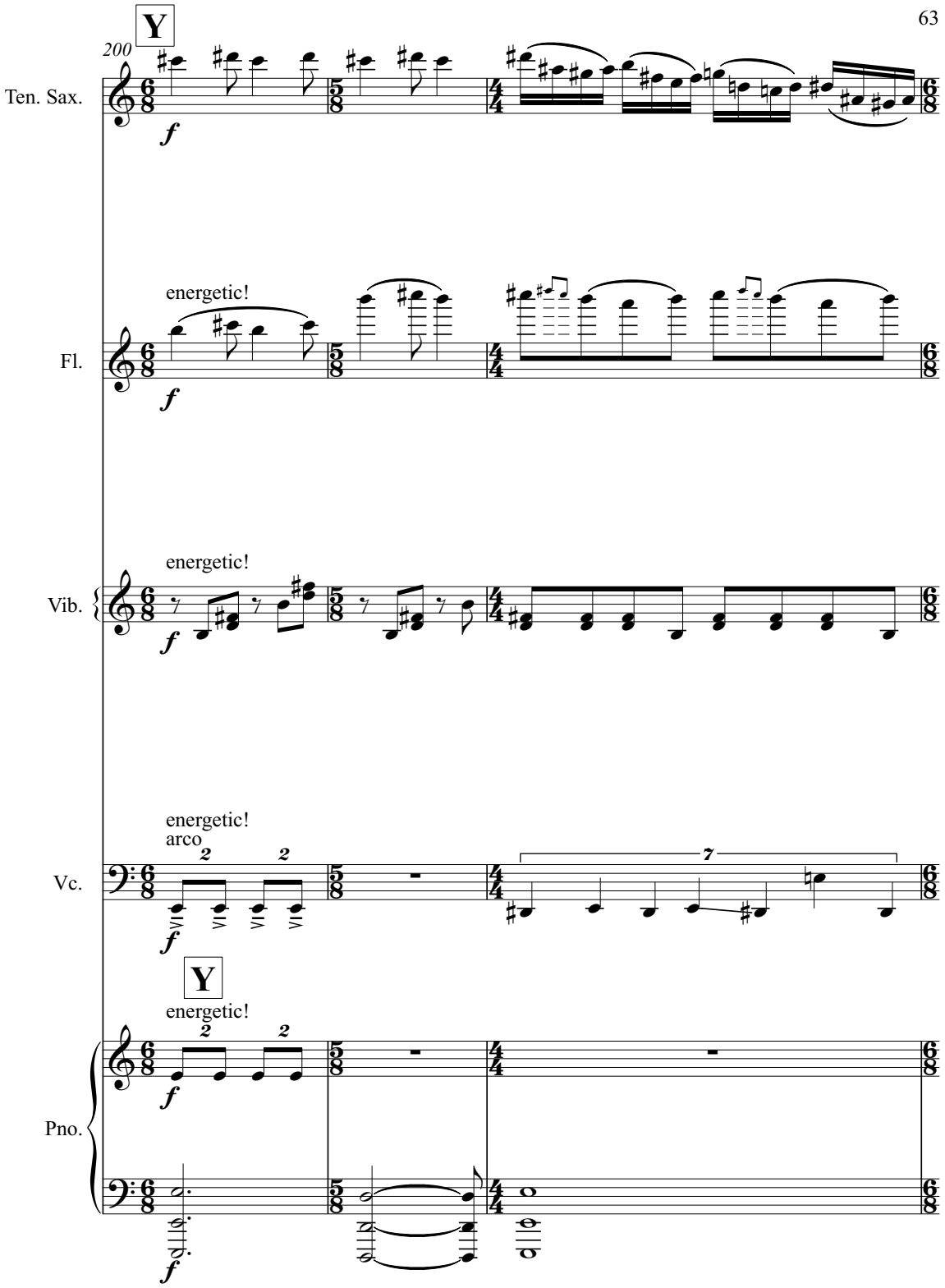
Y
200
Ten. Sax.
f
energetic!
Fl.
f
energetic!
Vib.
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energetic!
arco
Vc.
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Y
energetic!
Pno.
f
f

203
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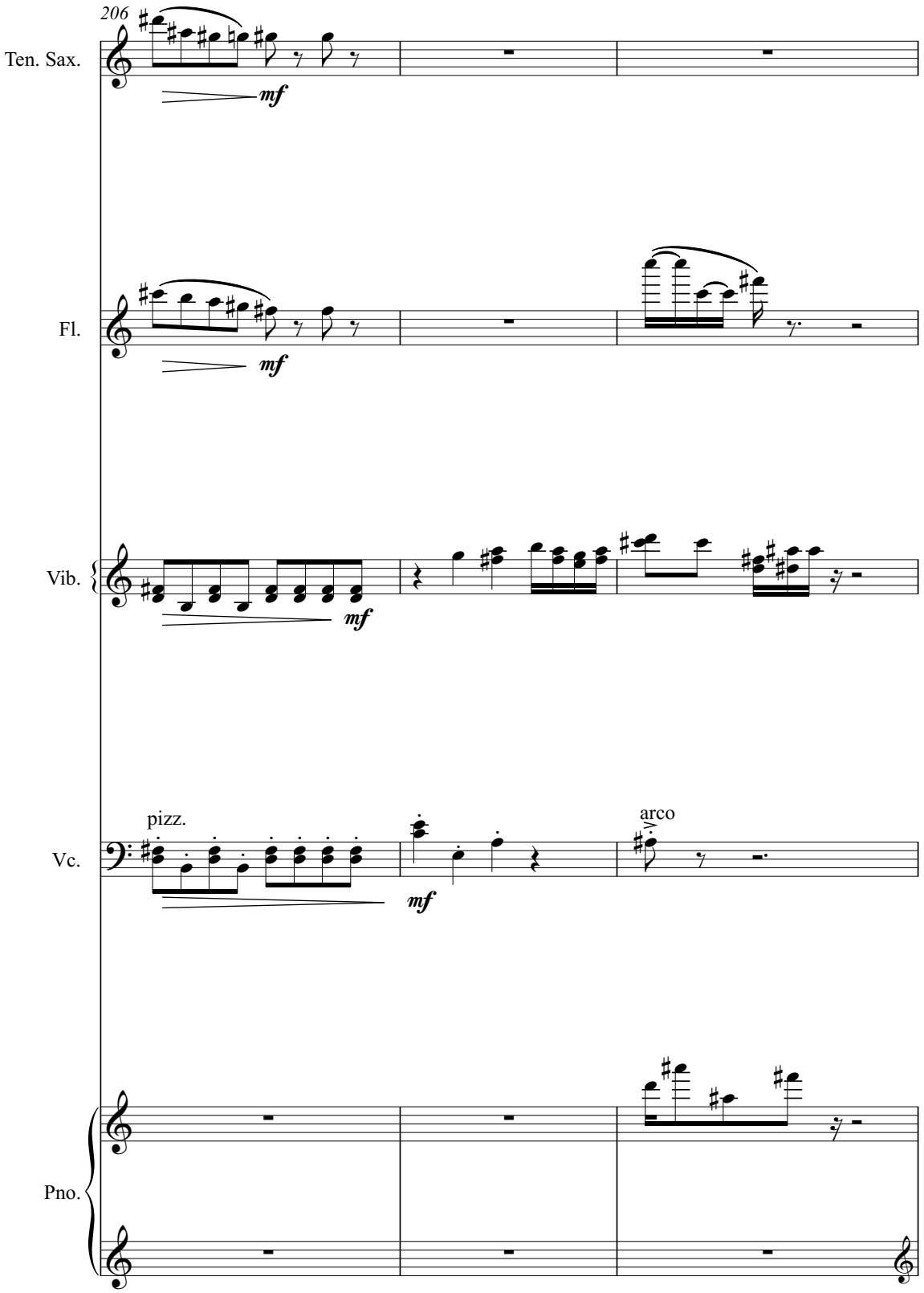
206
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mf
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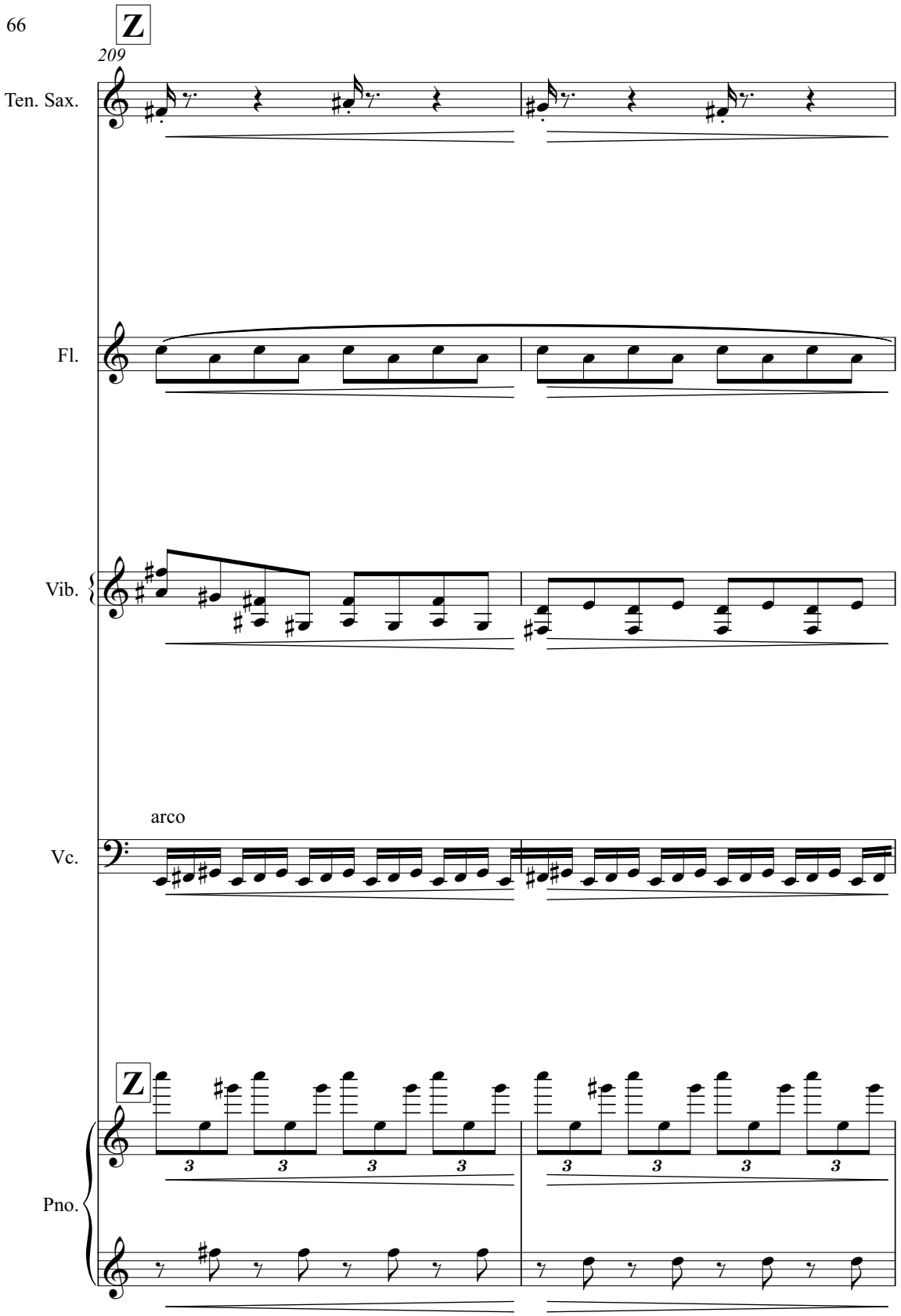
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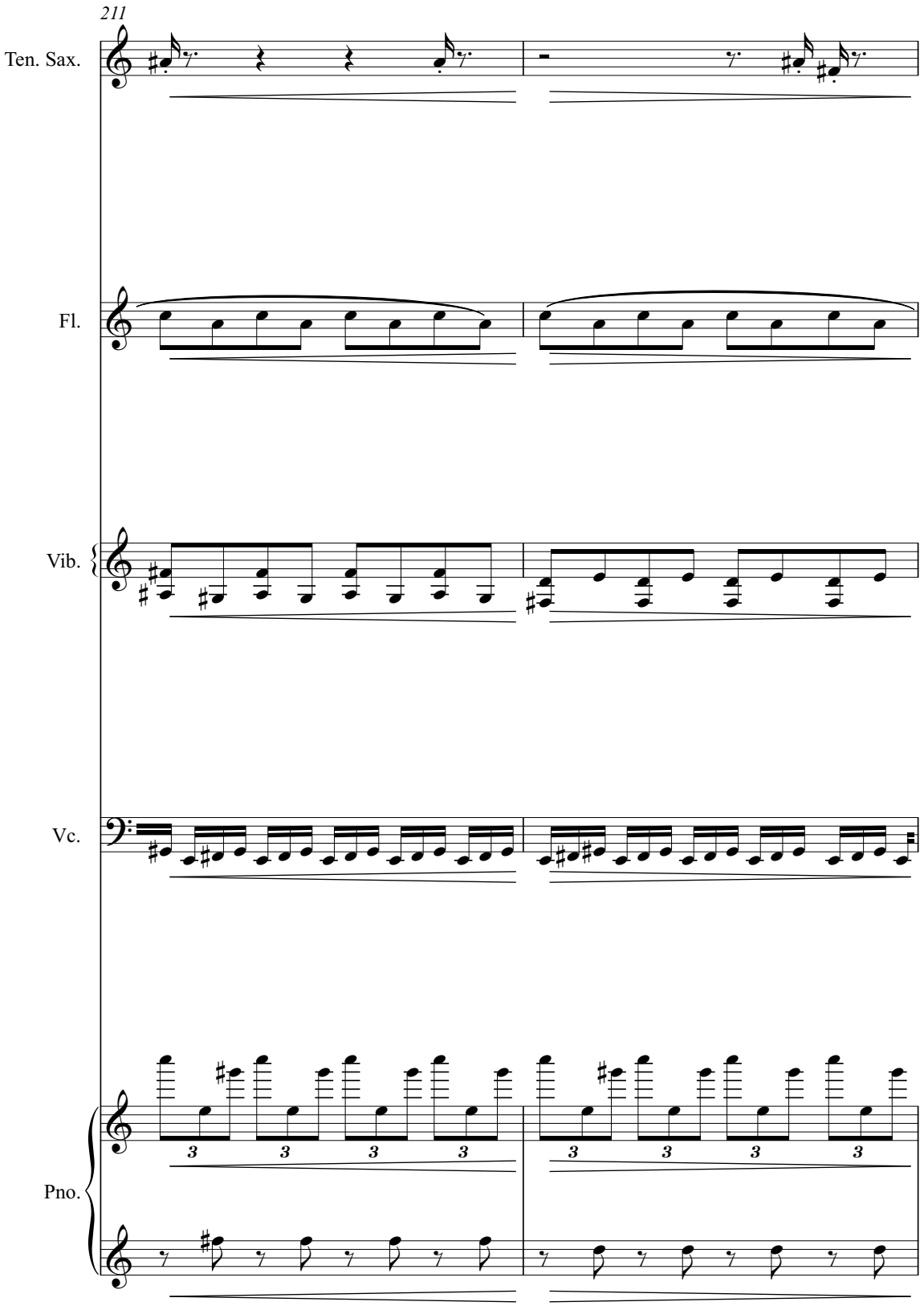
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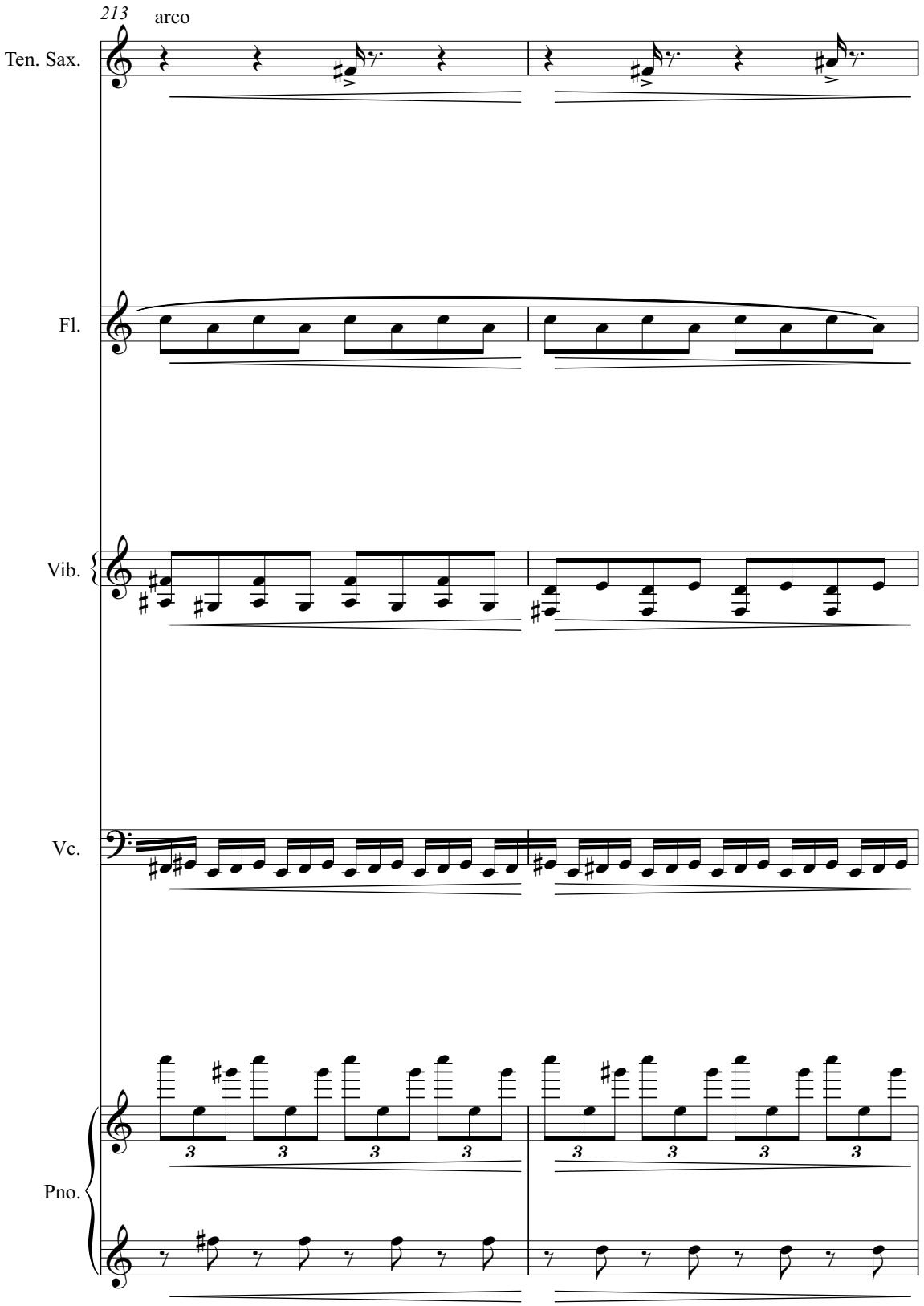
213
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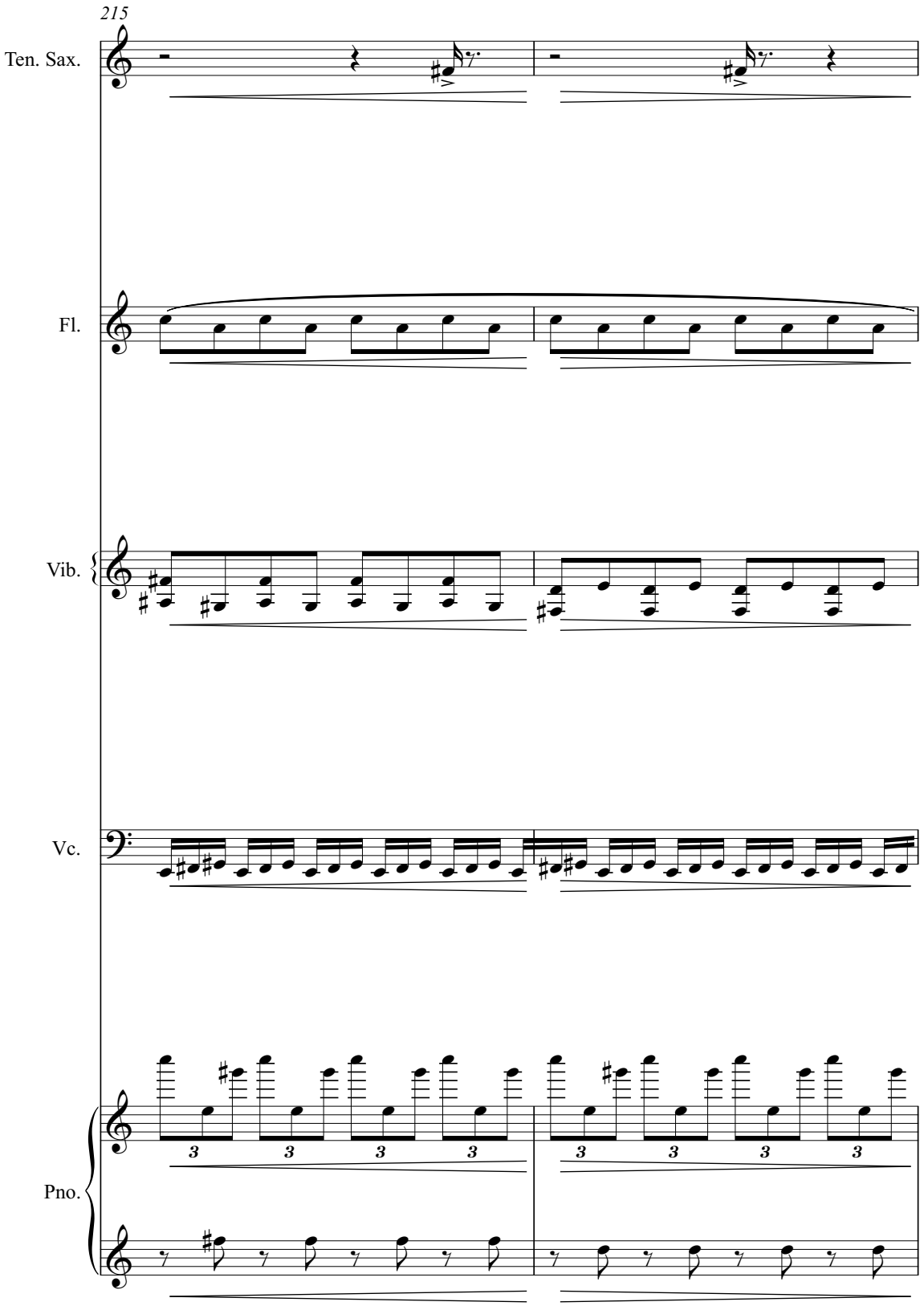
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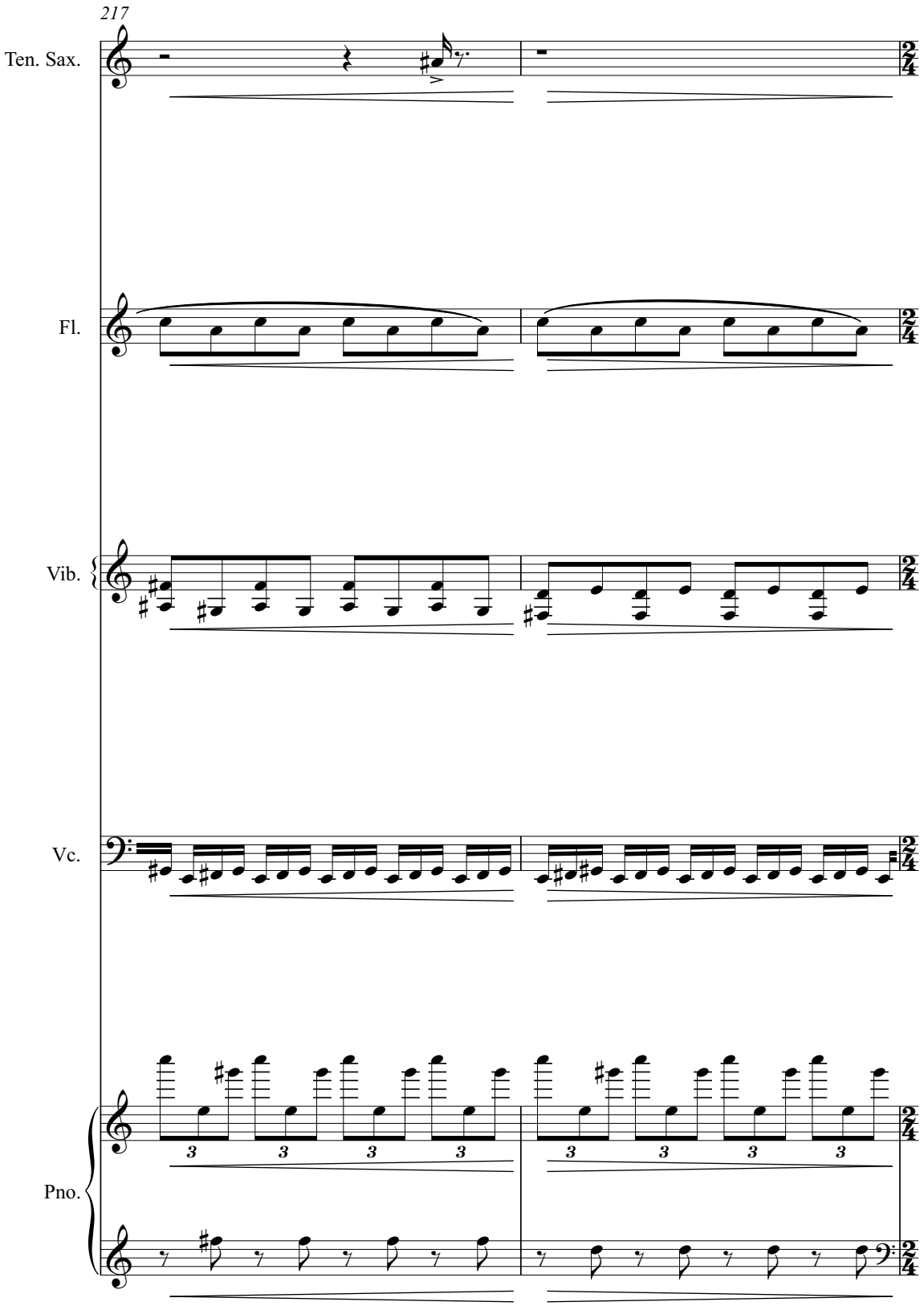
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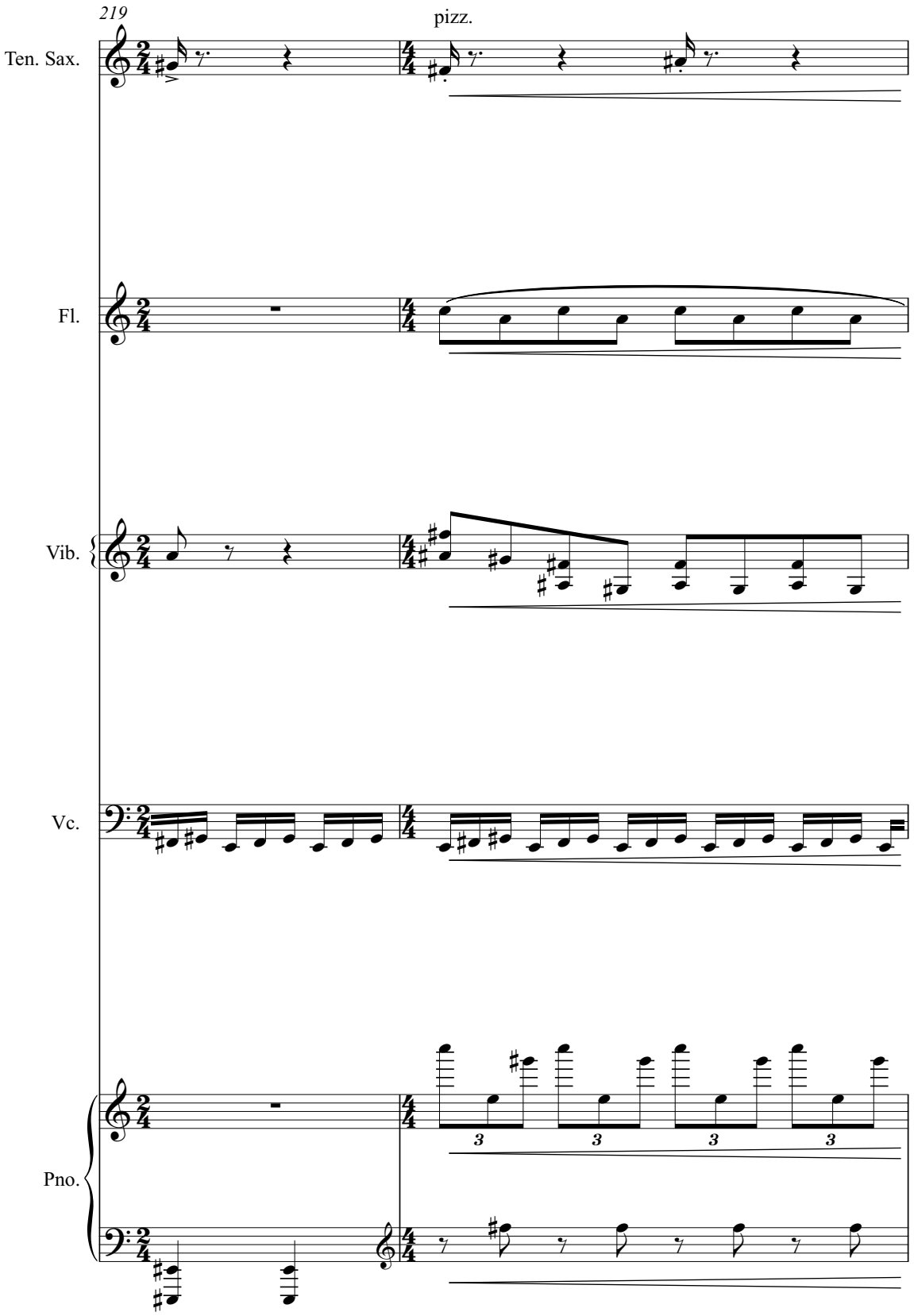
219
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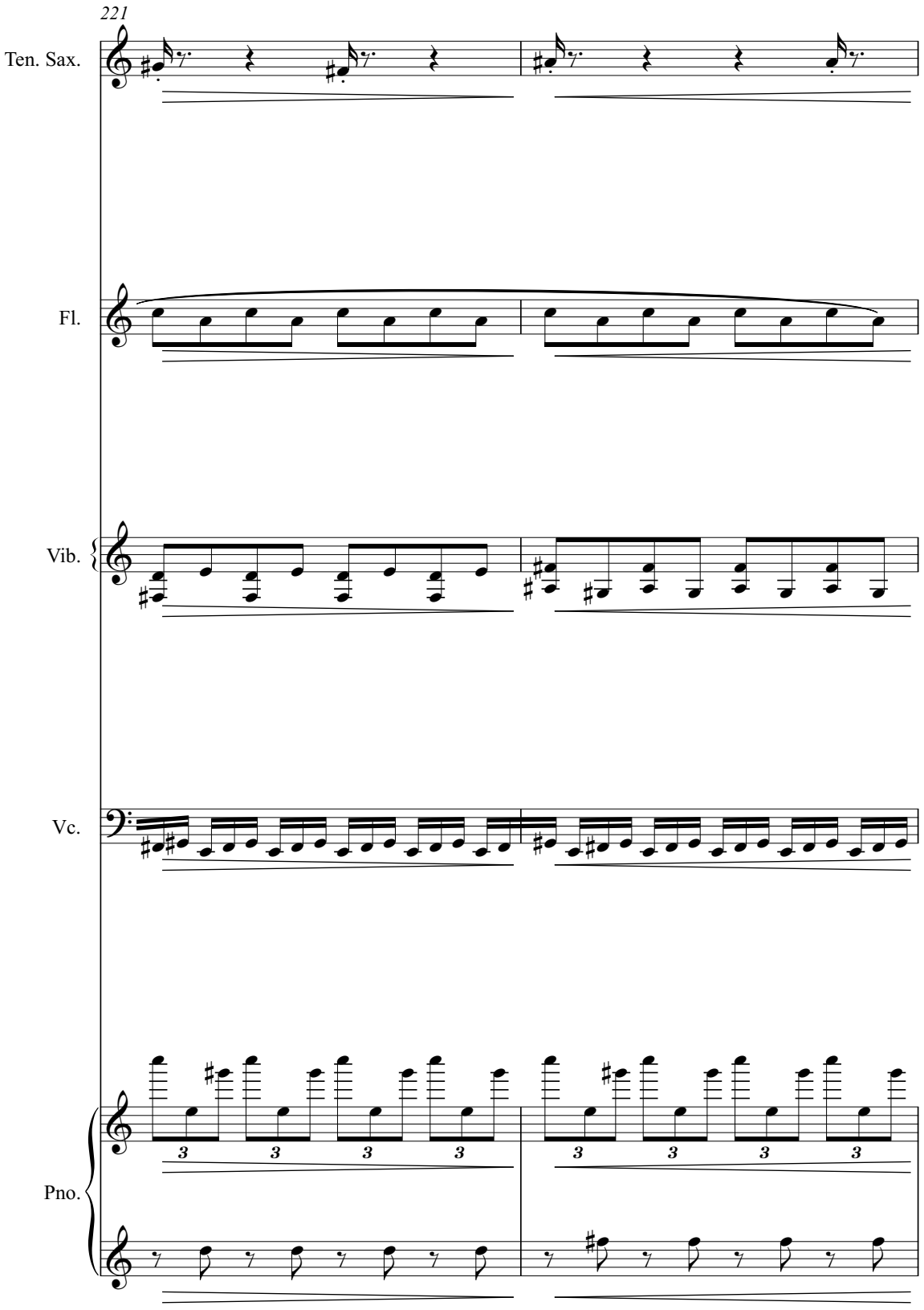
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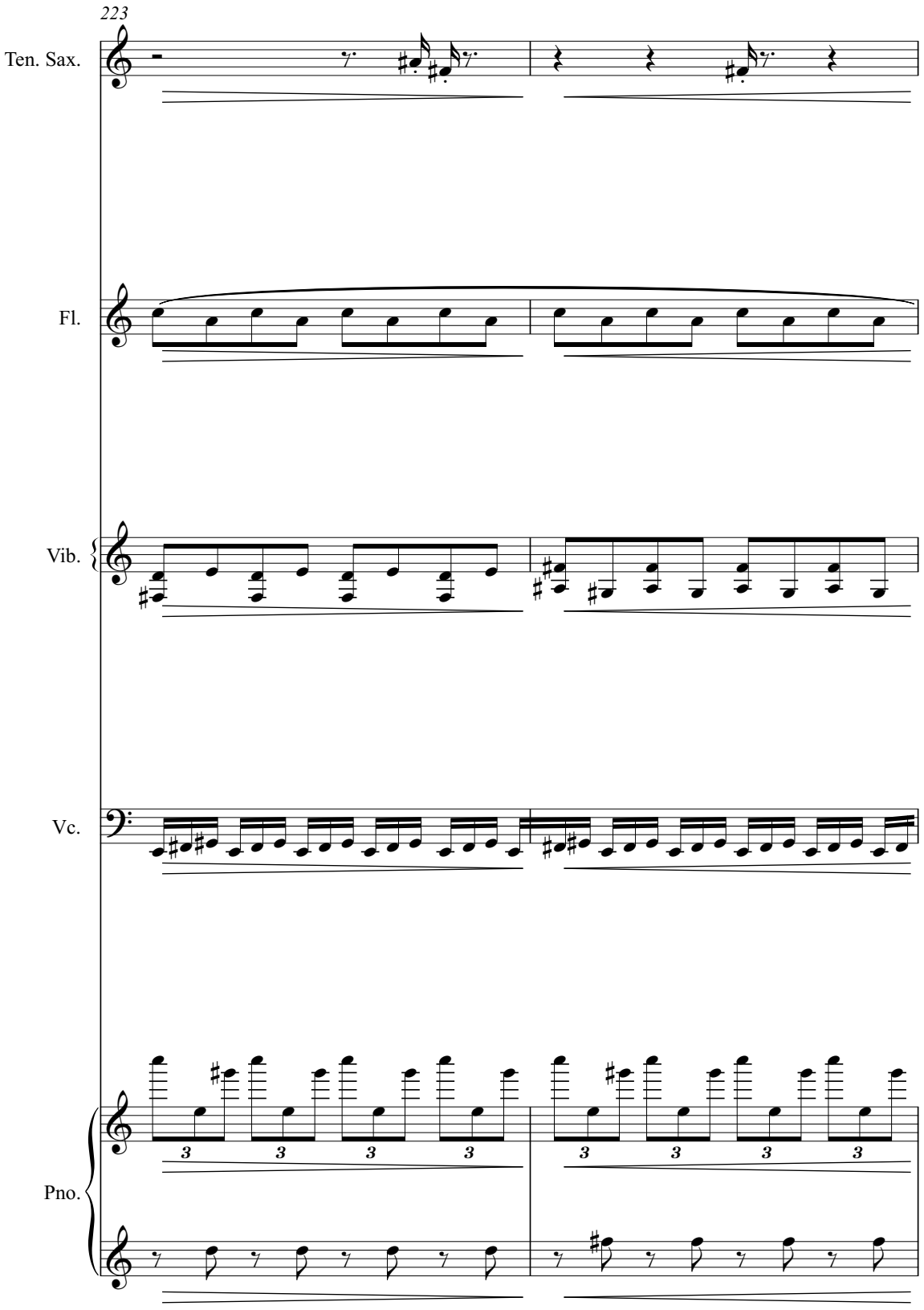
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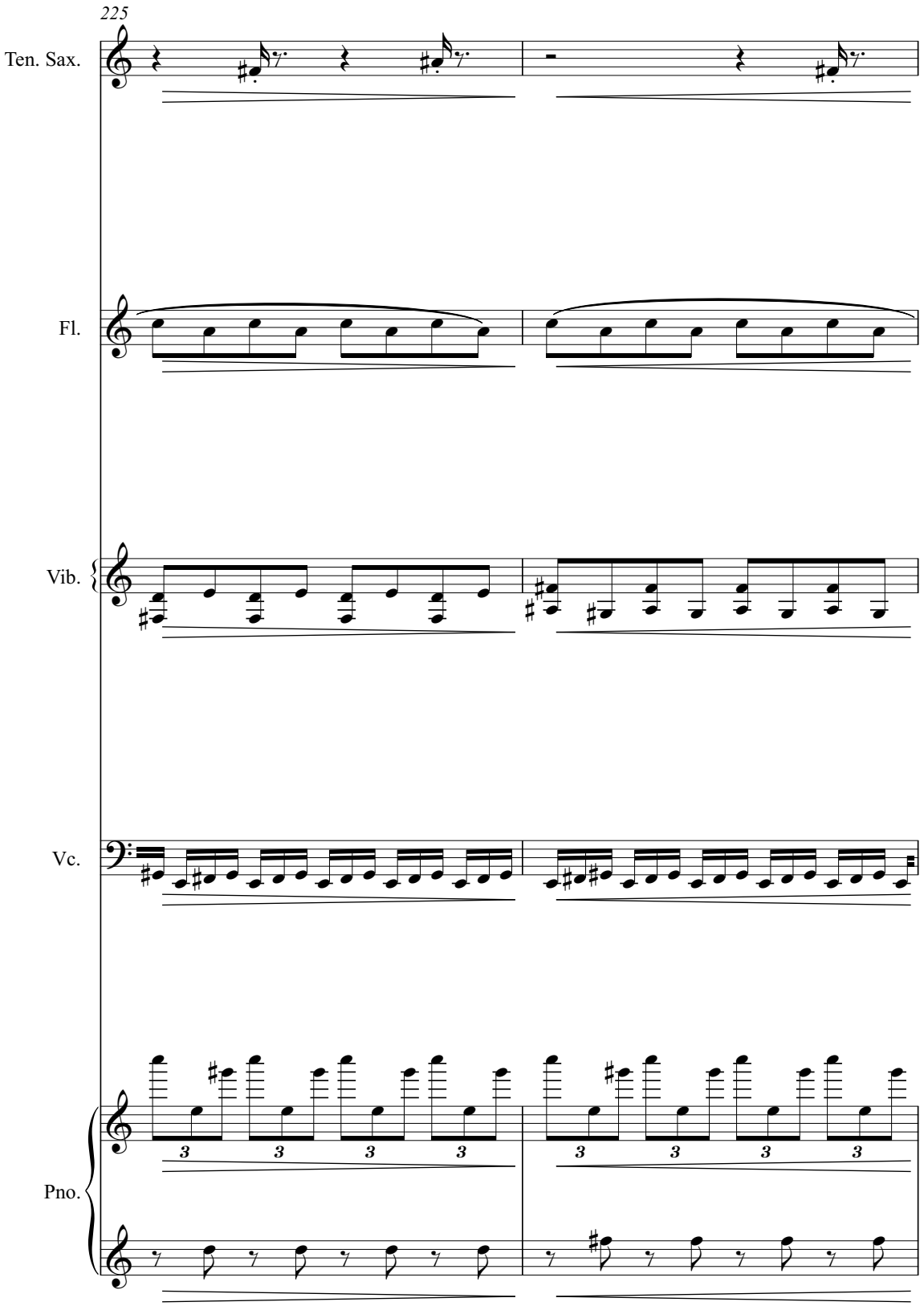
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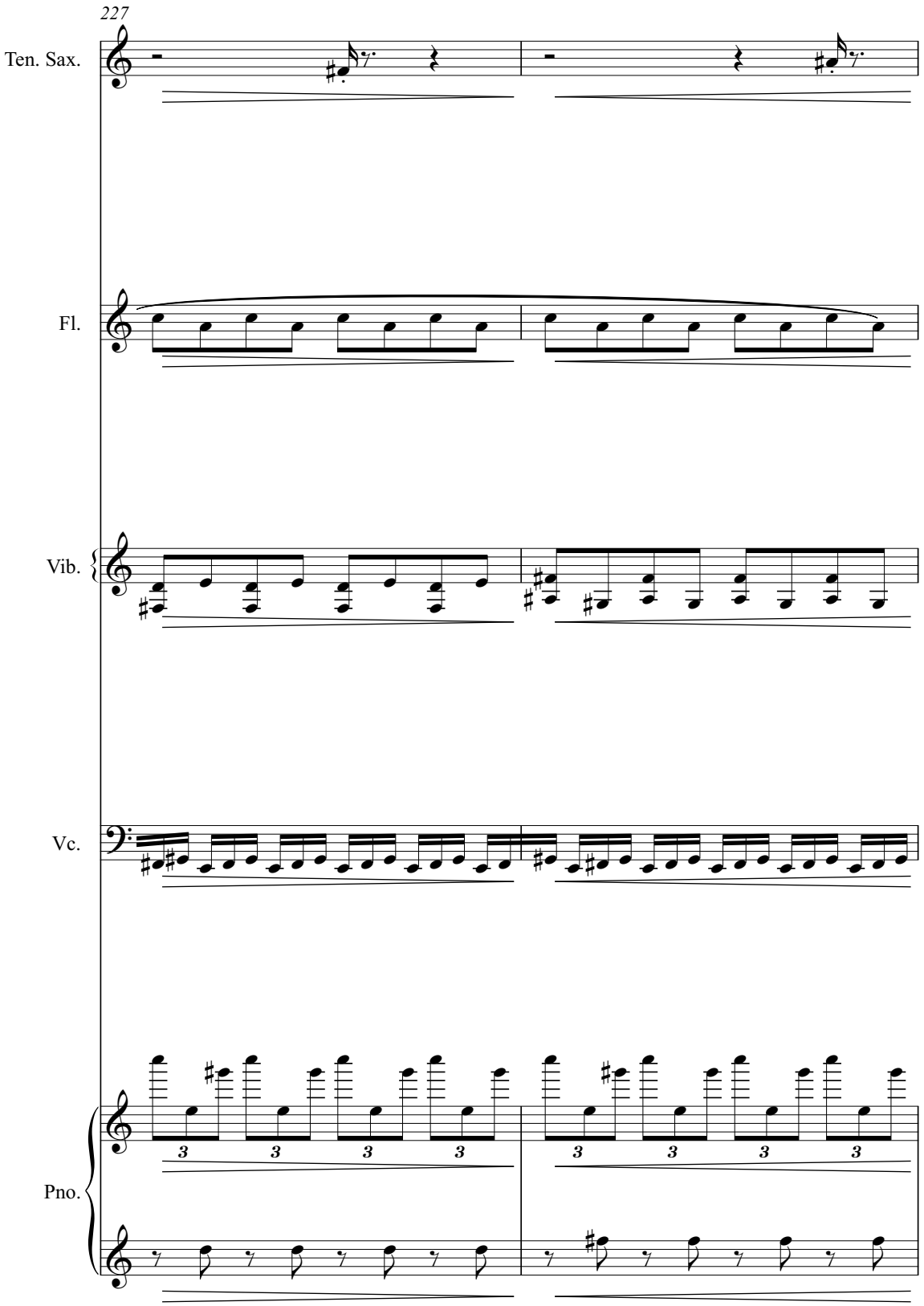
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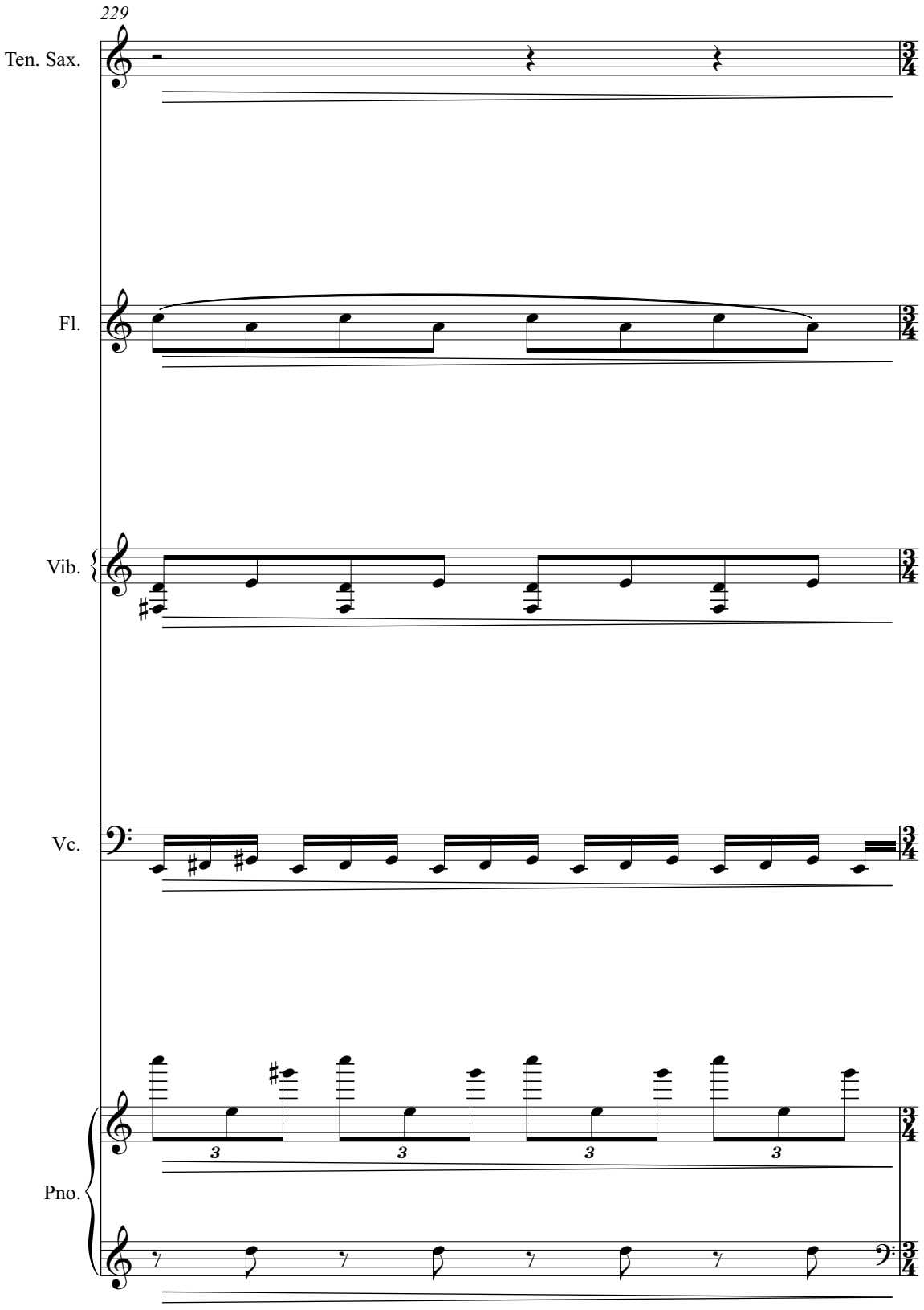
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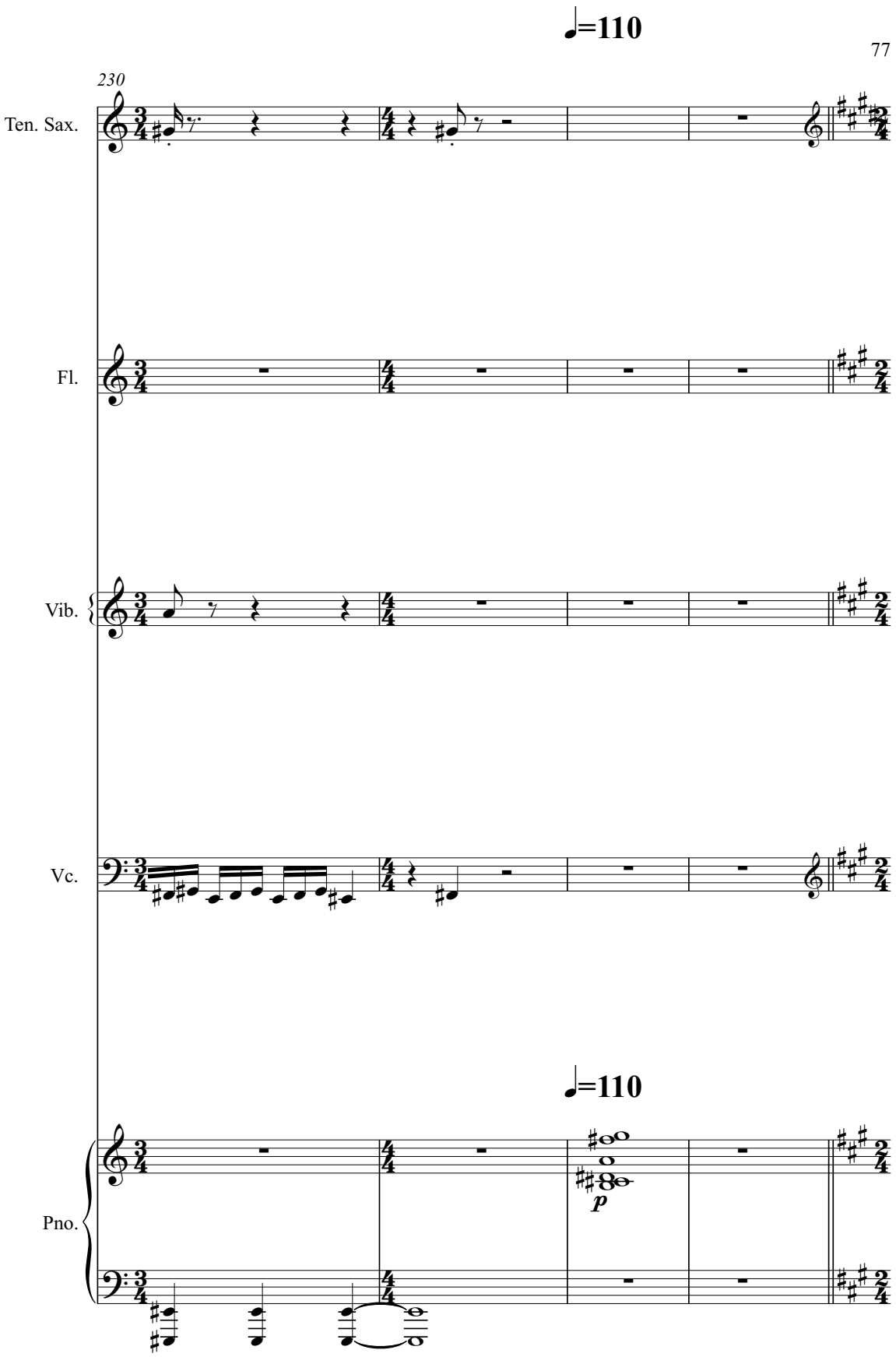
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230
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Fl.
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♩=110
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78
234
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Vc.
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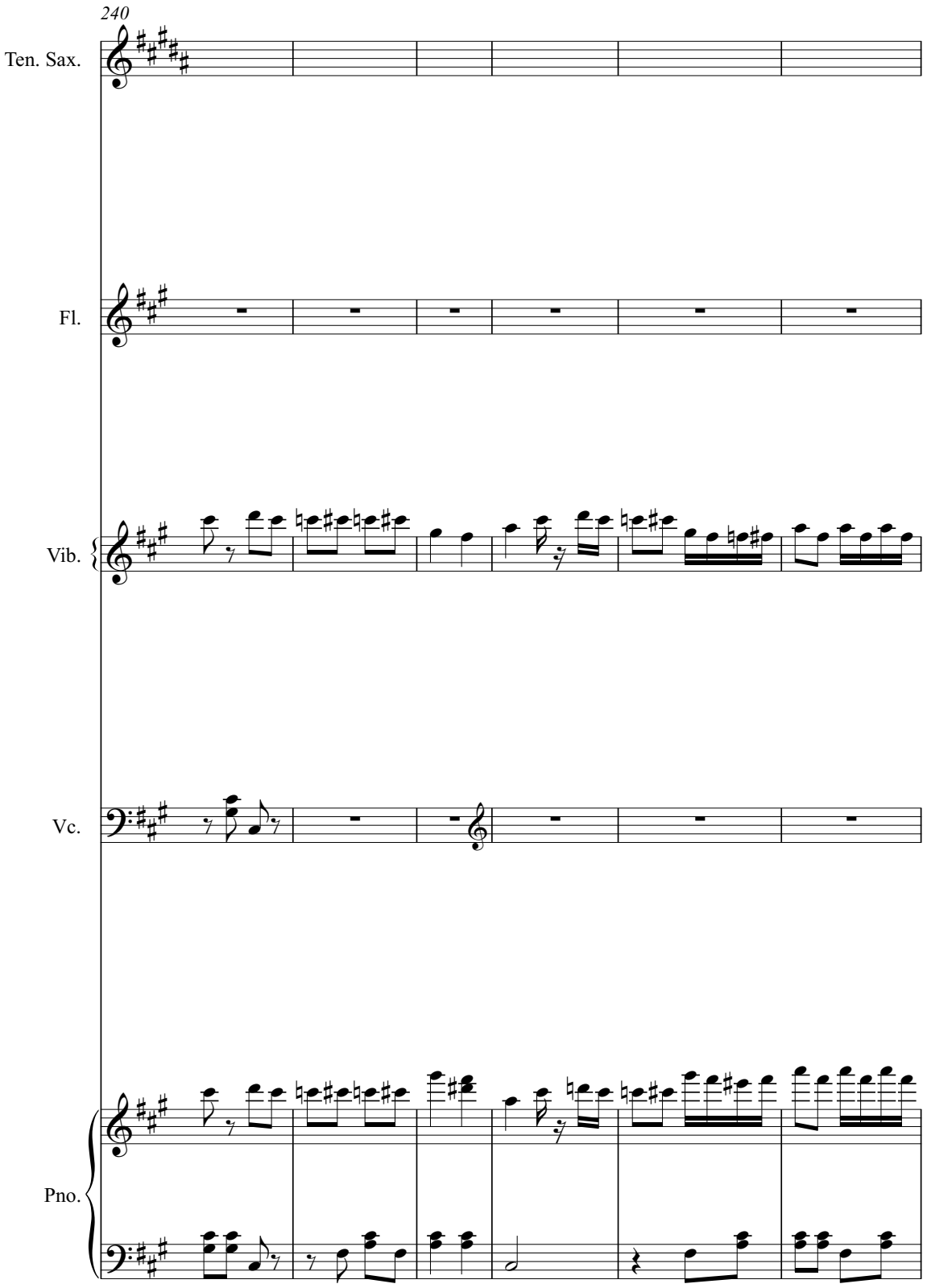
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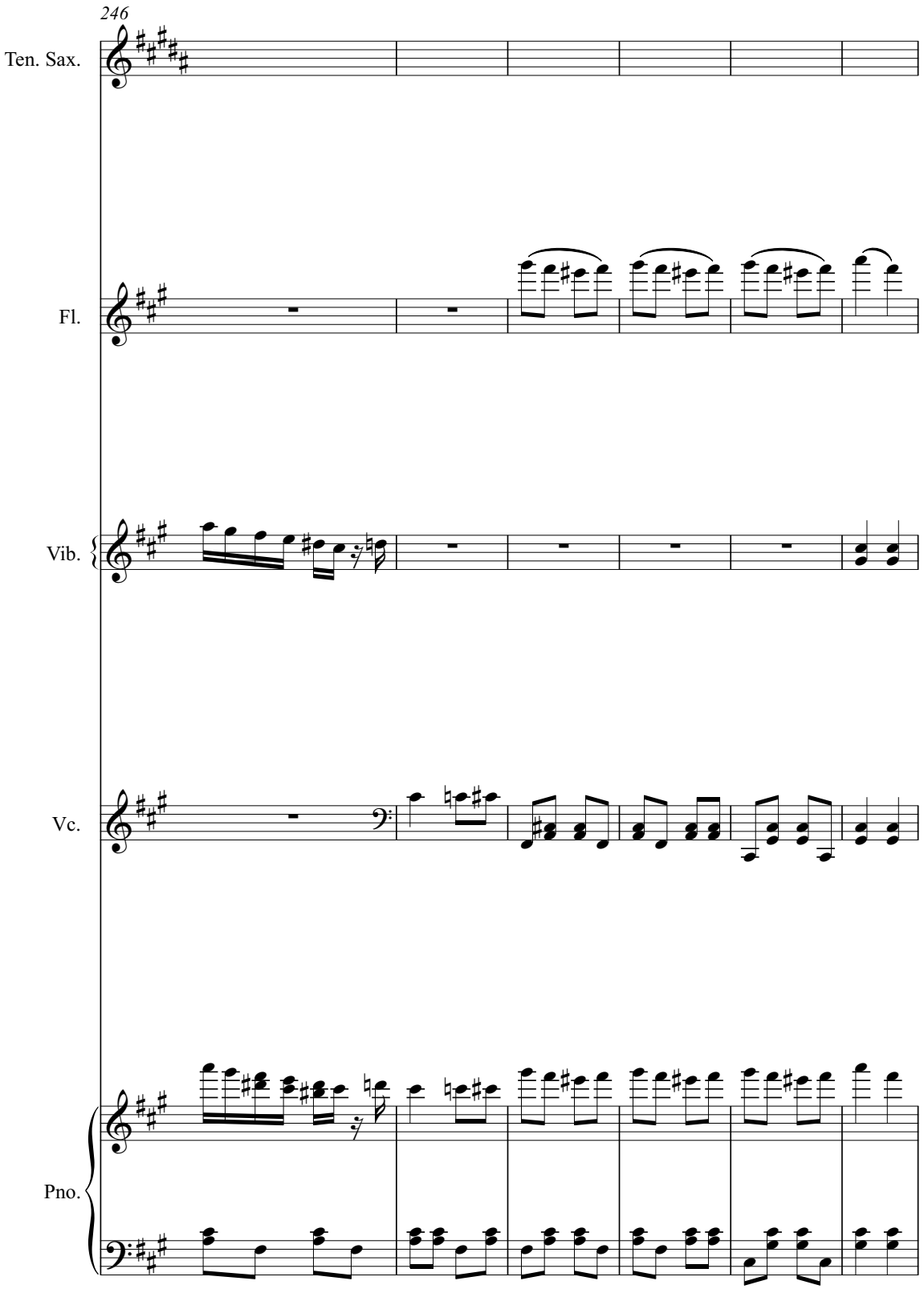
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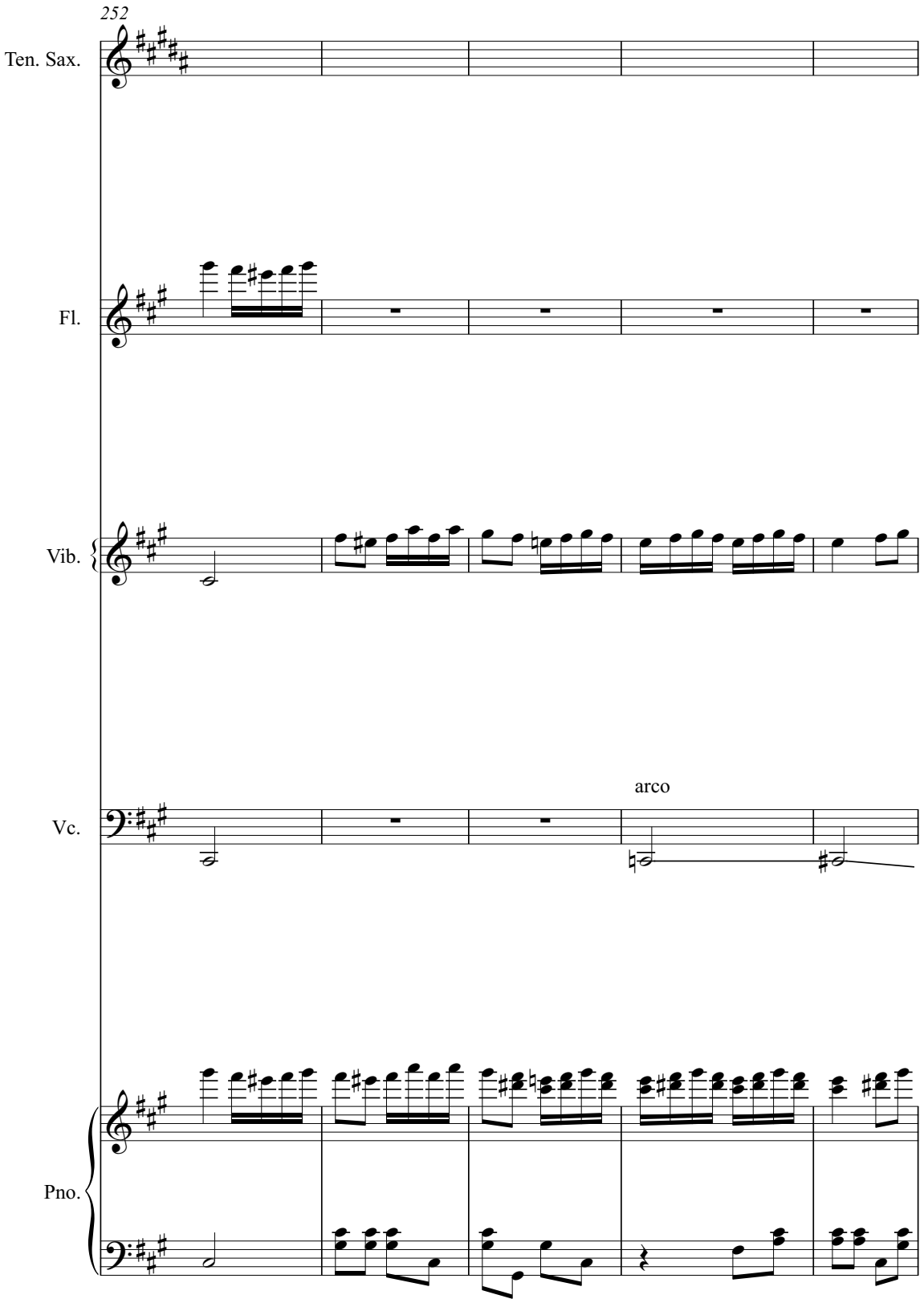
252
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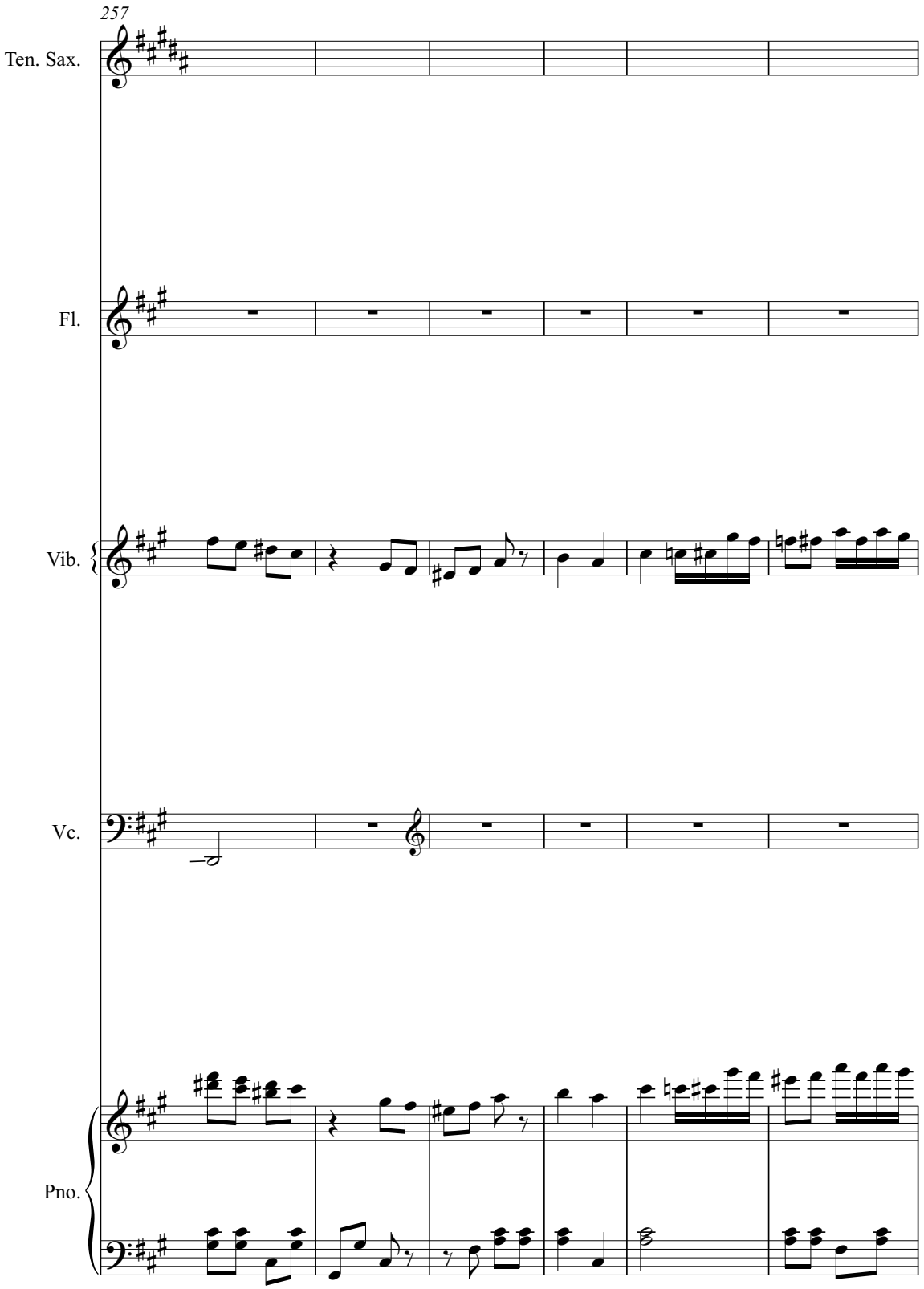
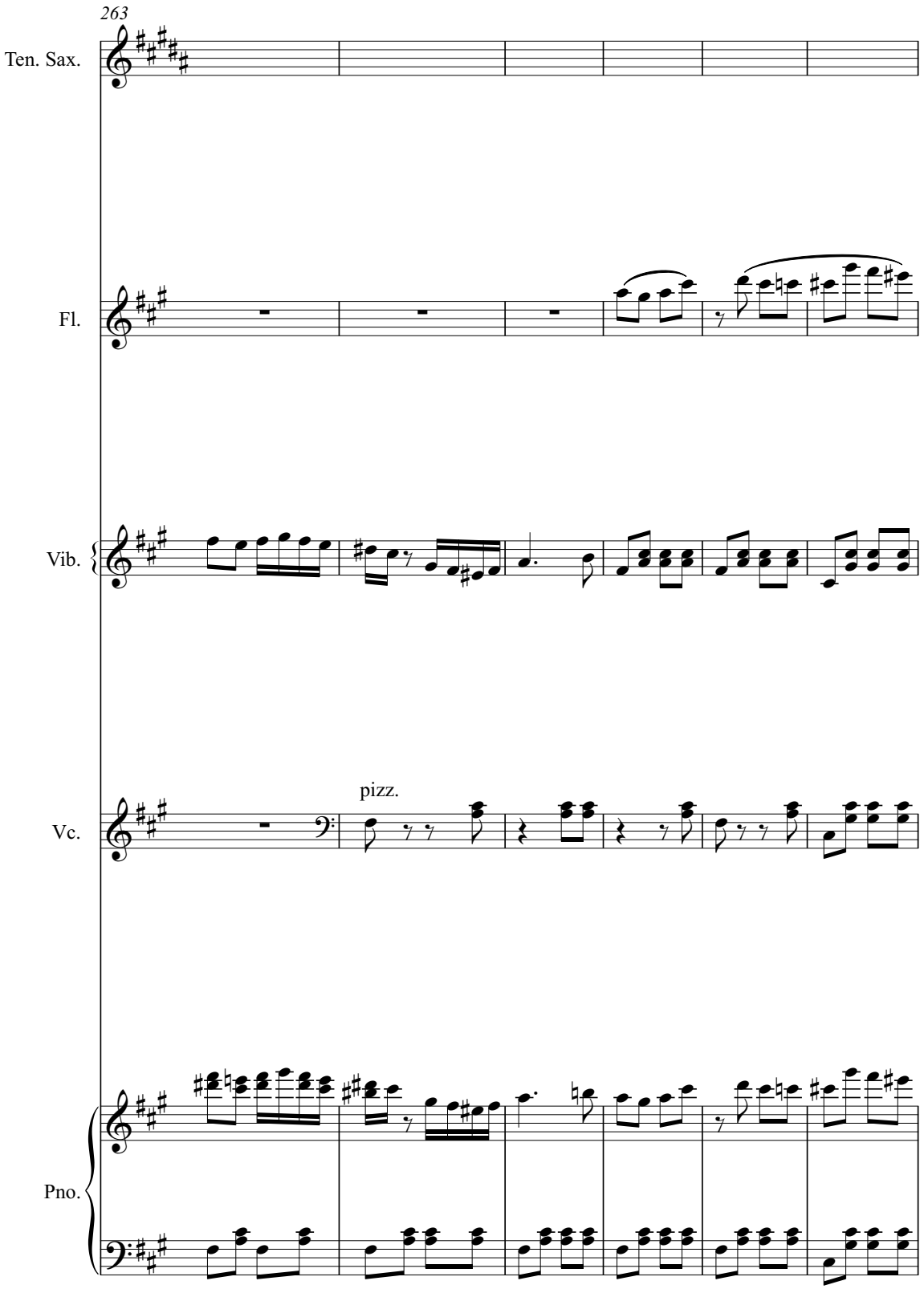
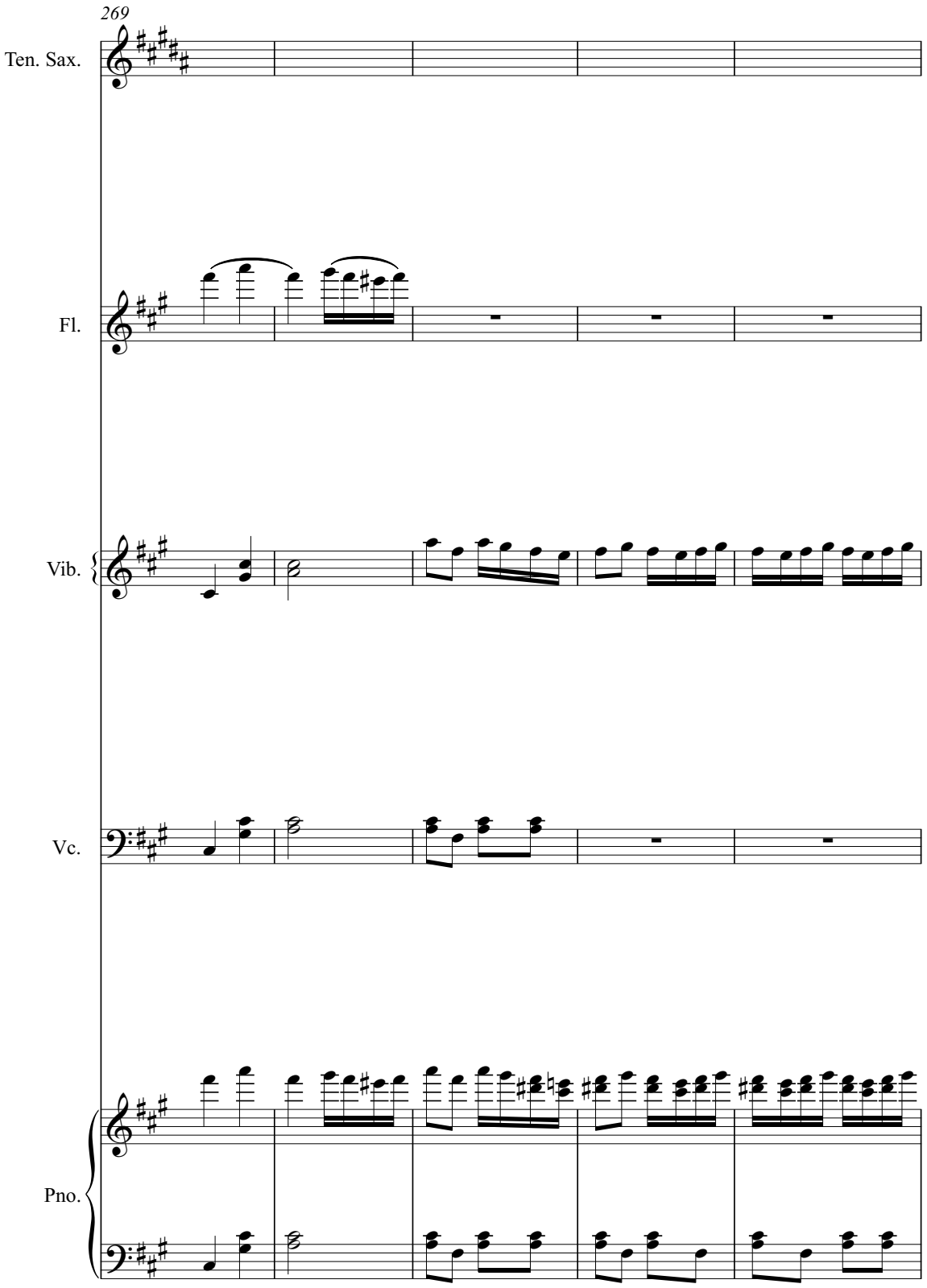
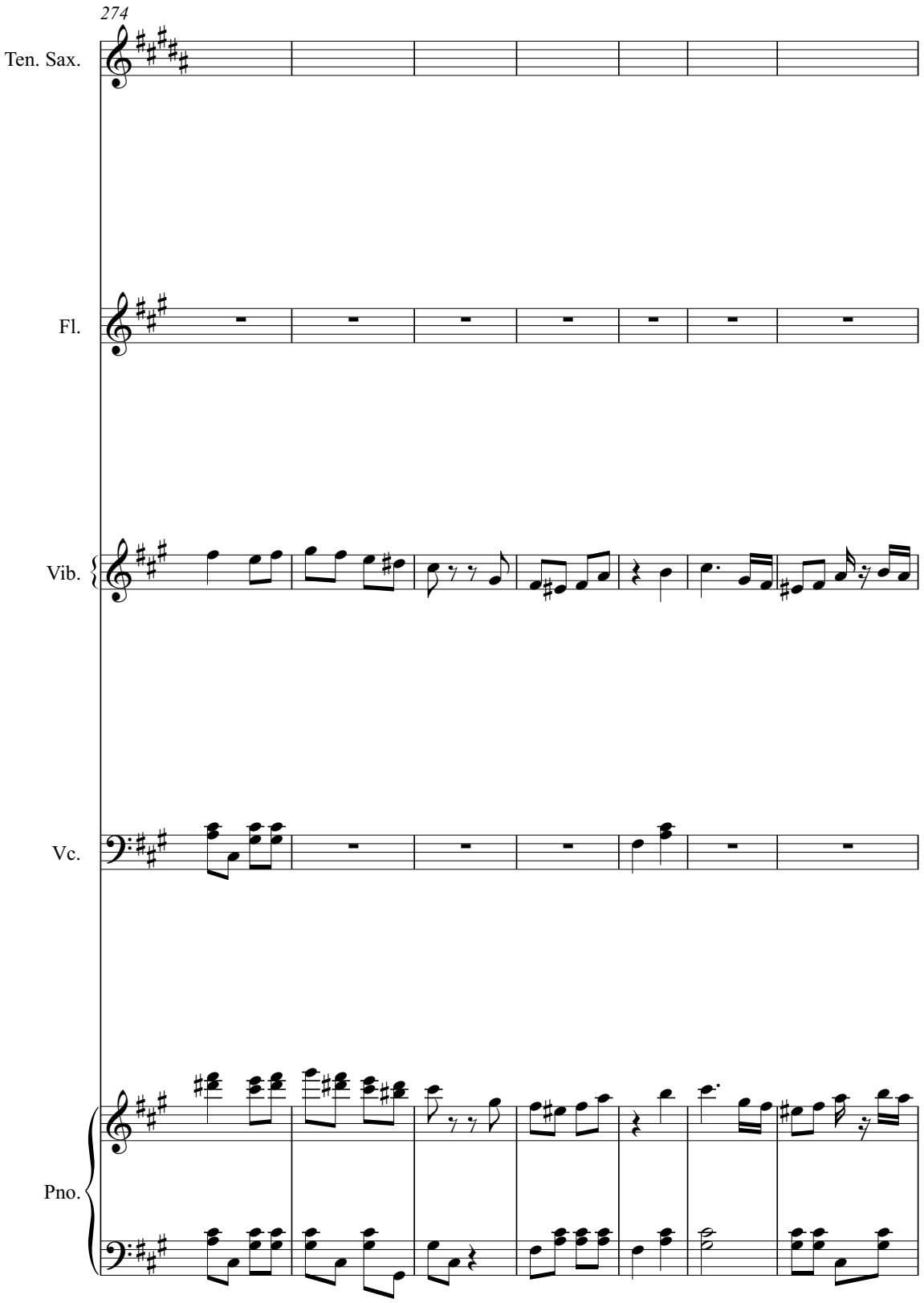
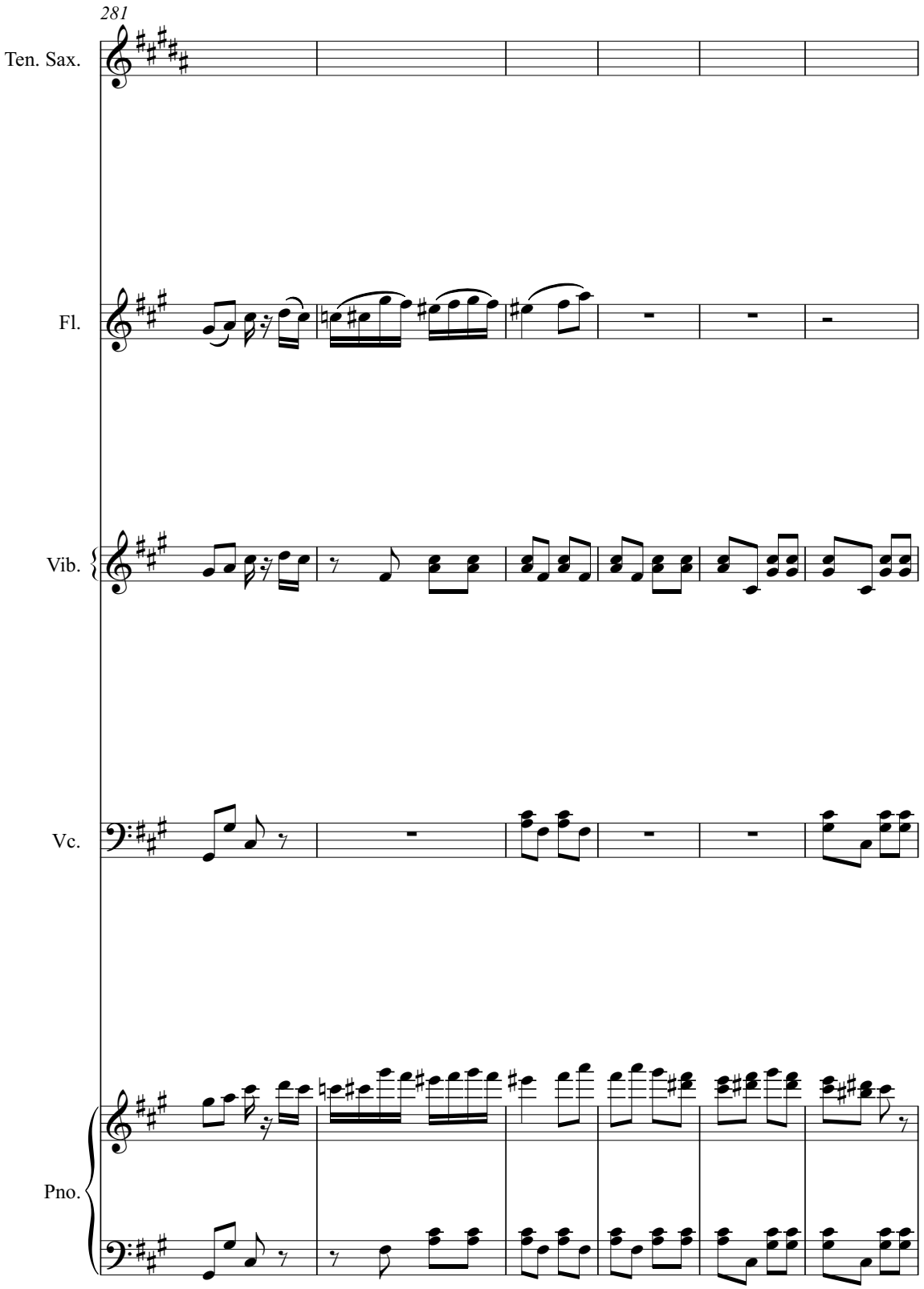

257
Ten. Sax.
Fl.
Vib.
Vc.
Pno.

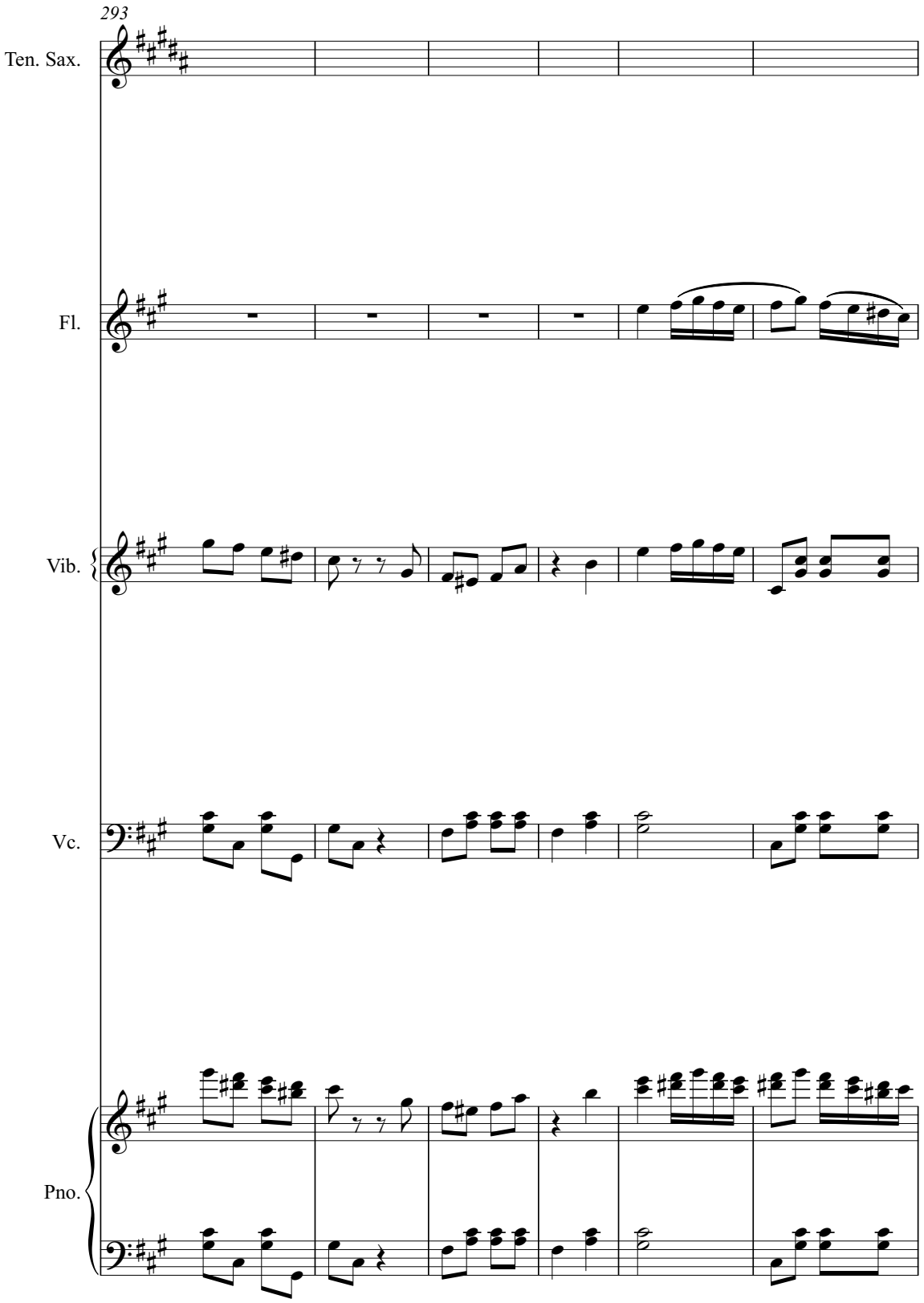

263
Ten. Sax.
Fl.
Vib.
Vc.
pizz.
Pno.

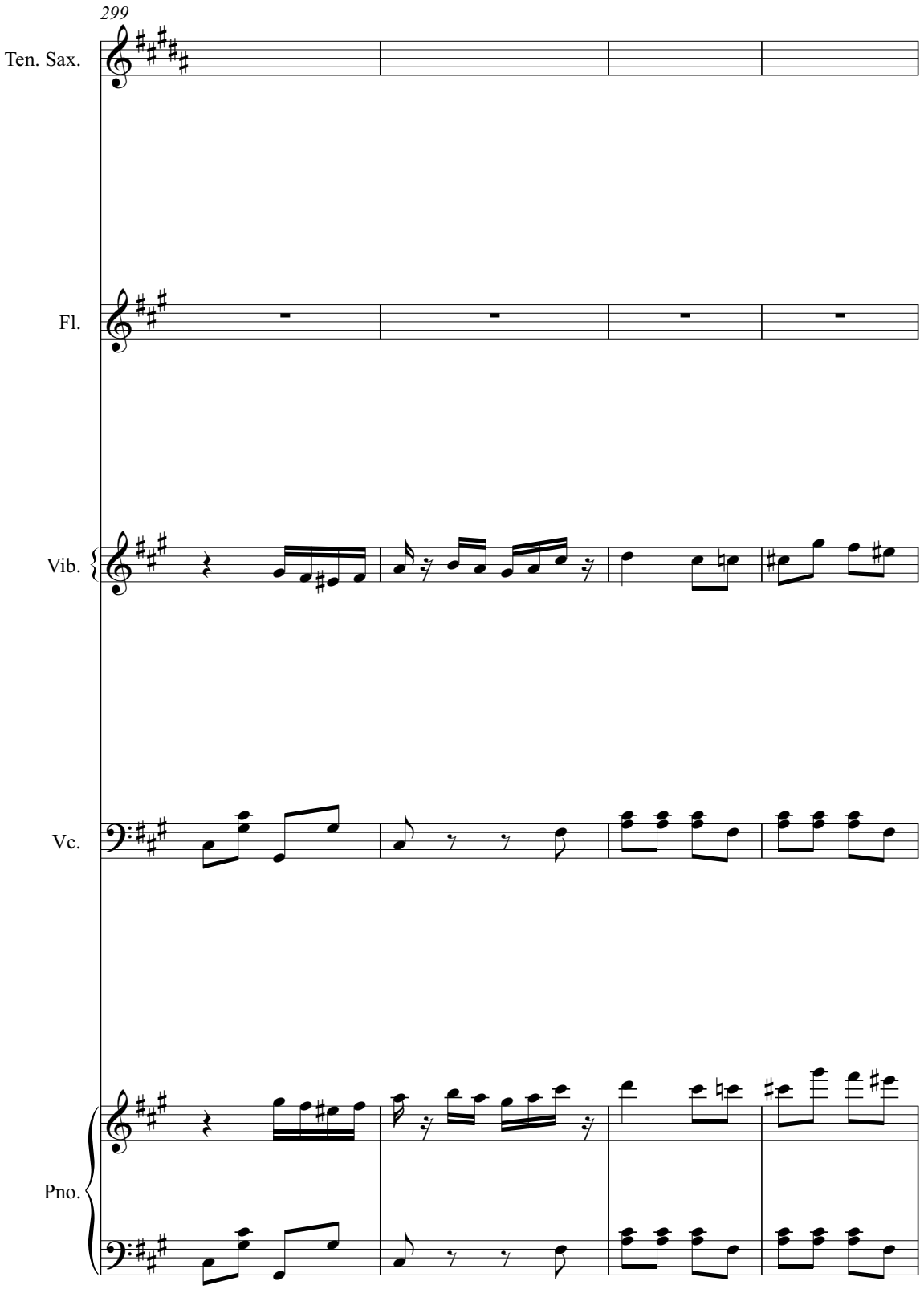

269
Ten. Sax.
Fl.
Vib.
Vc.
Pno.

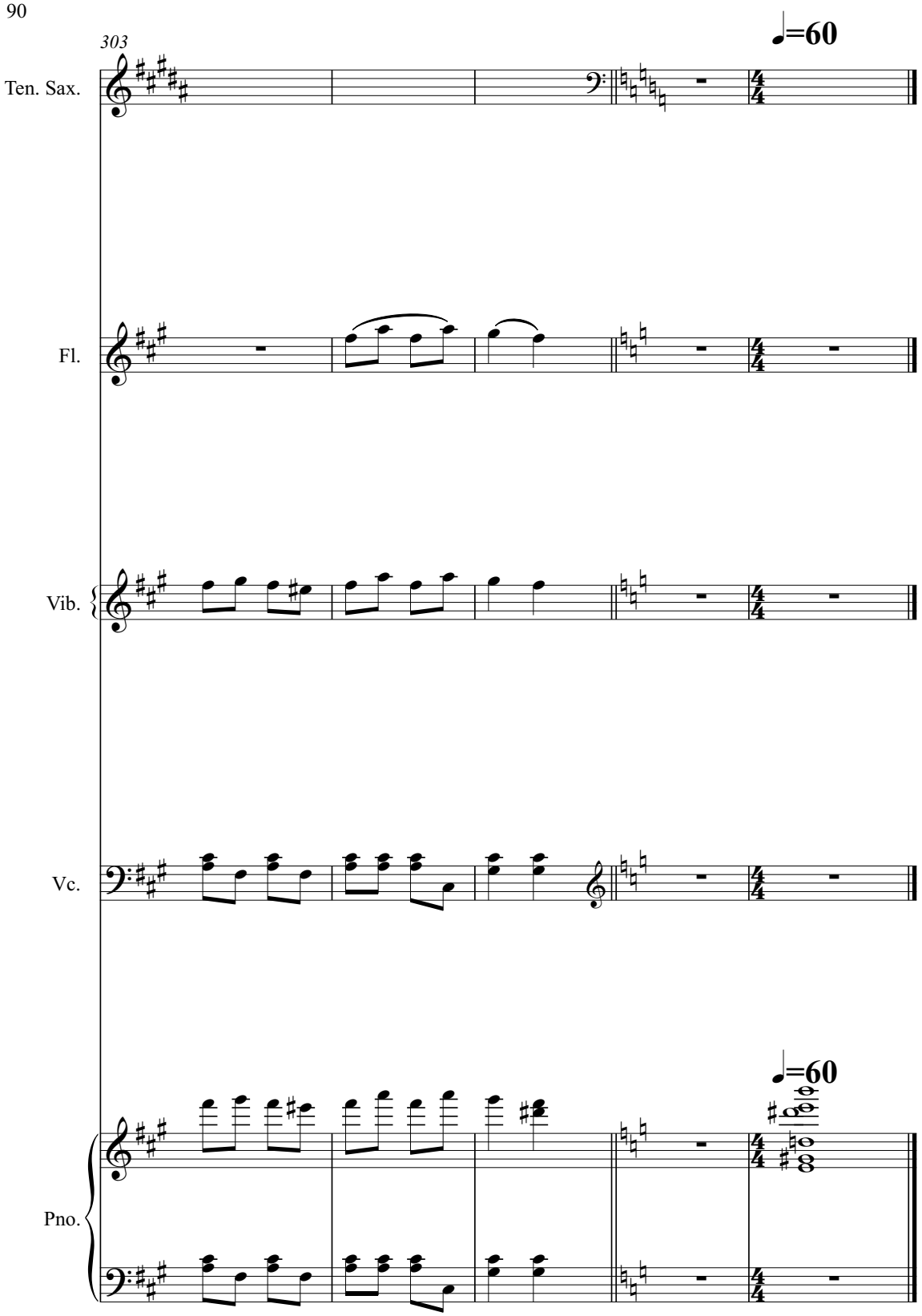

274
Ten. Sax.
Fl.
Vib.
Vc.
Pno.


281
Ten. Sax.
Fl.
Vib.
Vc.
Pno.

287
Ten. Sax.
Fl.
Vib.
Vc.
Pno.


293
Ten. Sax.
Fl.
Vib.
Vc.
Pno.


299
Ten. Sax.
Fl.
Vib.
Vc.
Pno.


303
♩=60
Ten. Sax.
Fl.
Vib.
Vc.
♩=60
Pno.

C.3

Small Town (2014-2015)
For Solo Piano

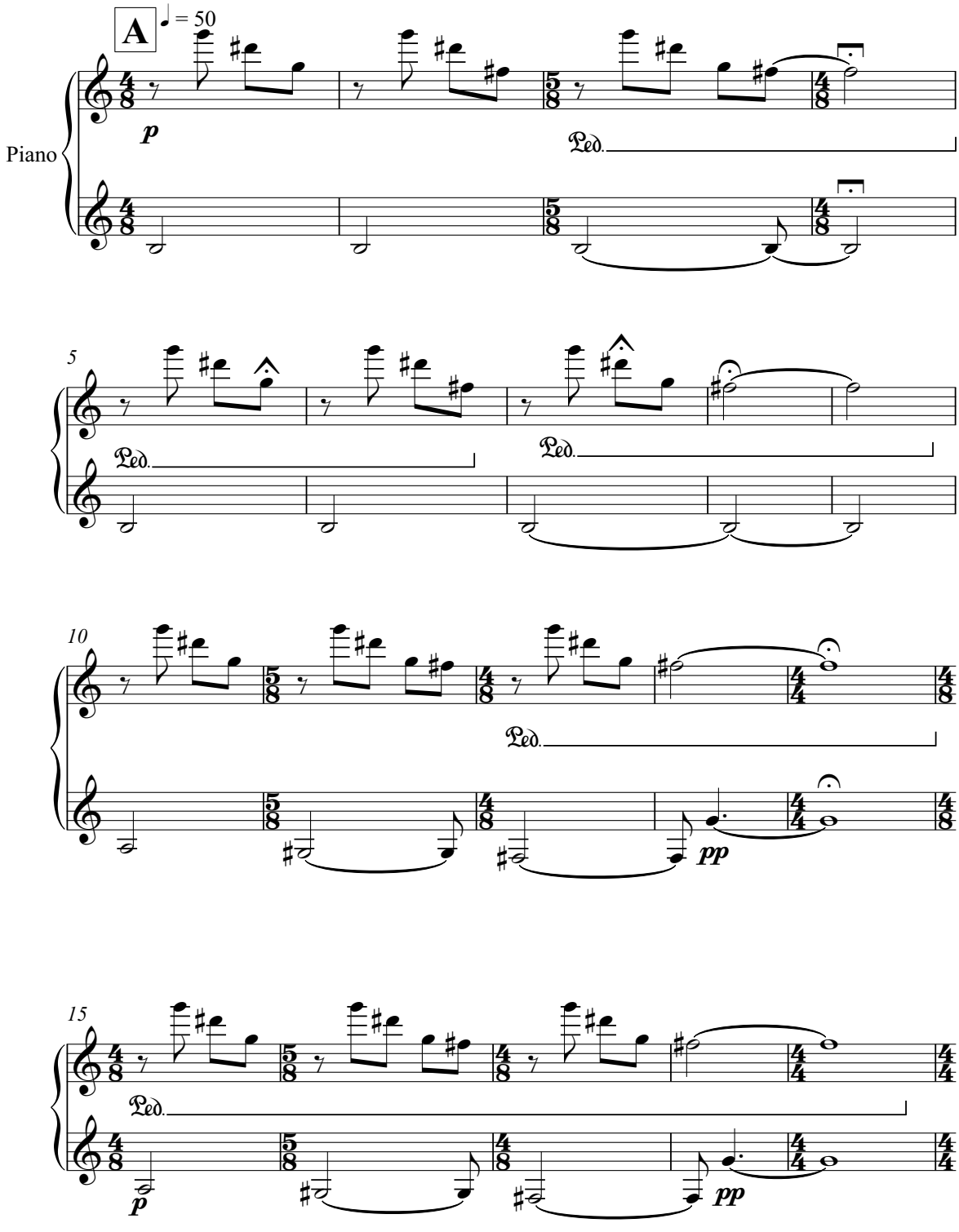
Ori Barel

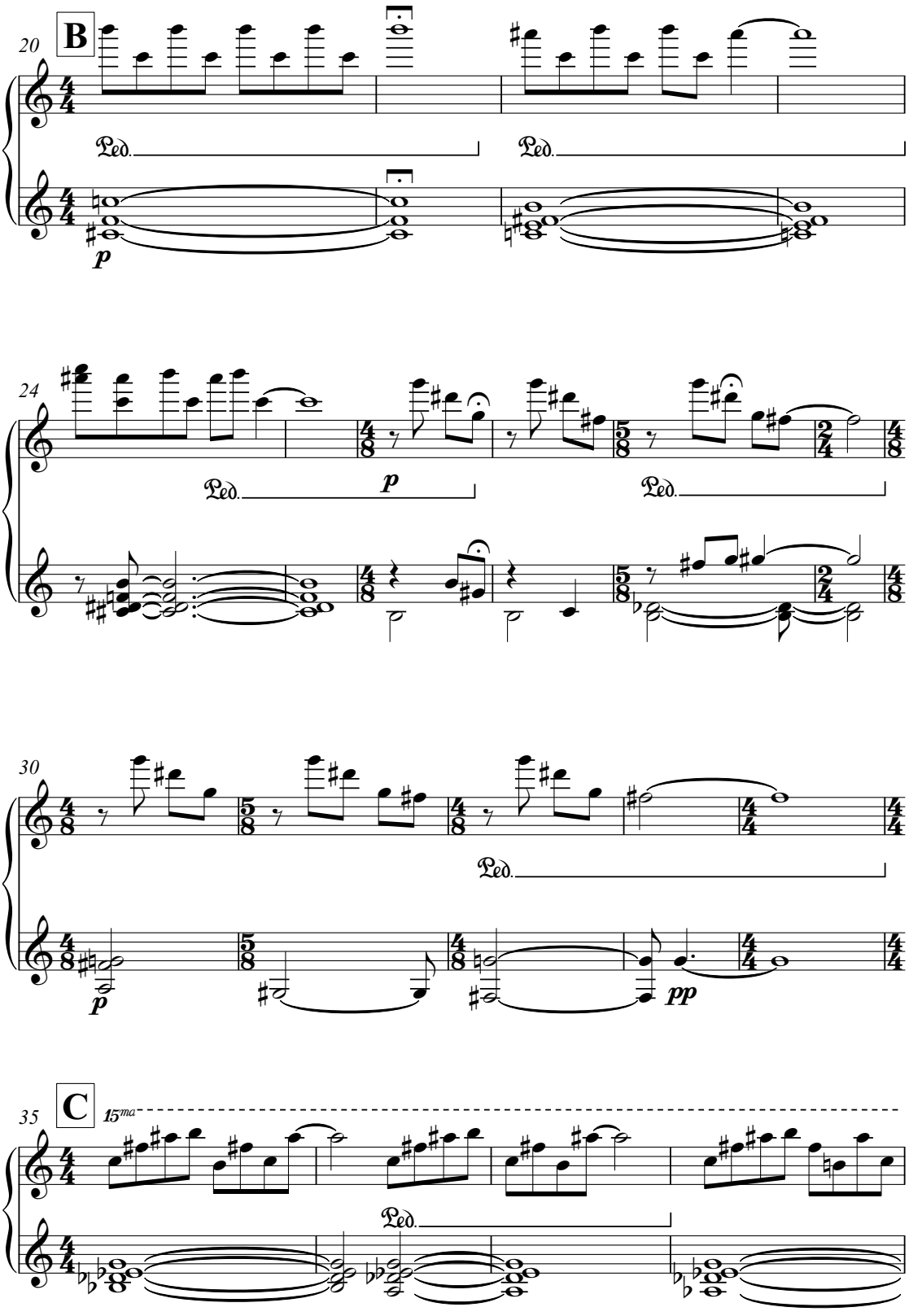
Small Town - For Solo Piano

Small Town

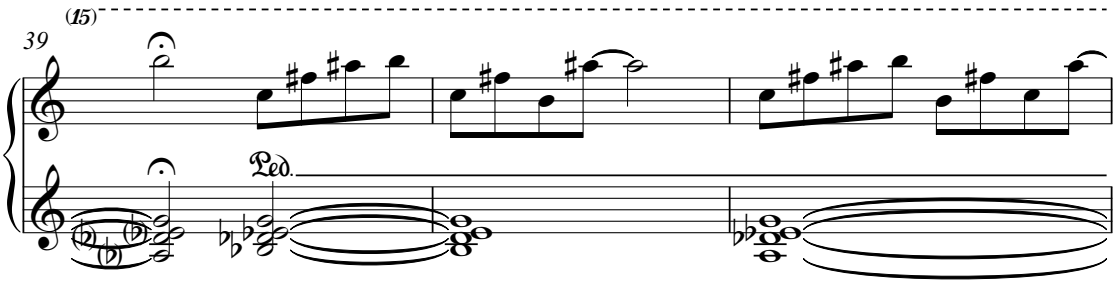
I. Staircases

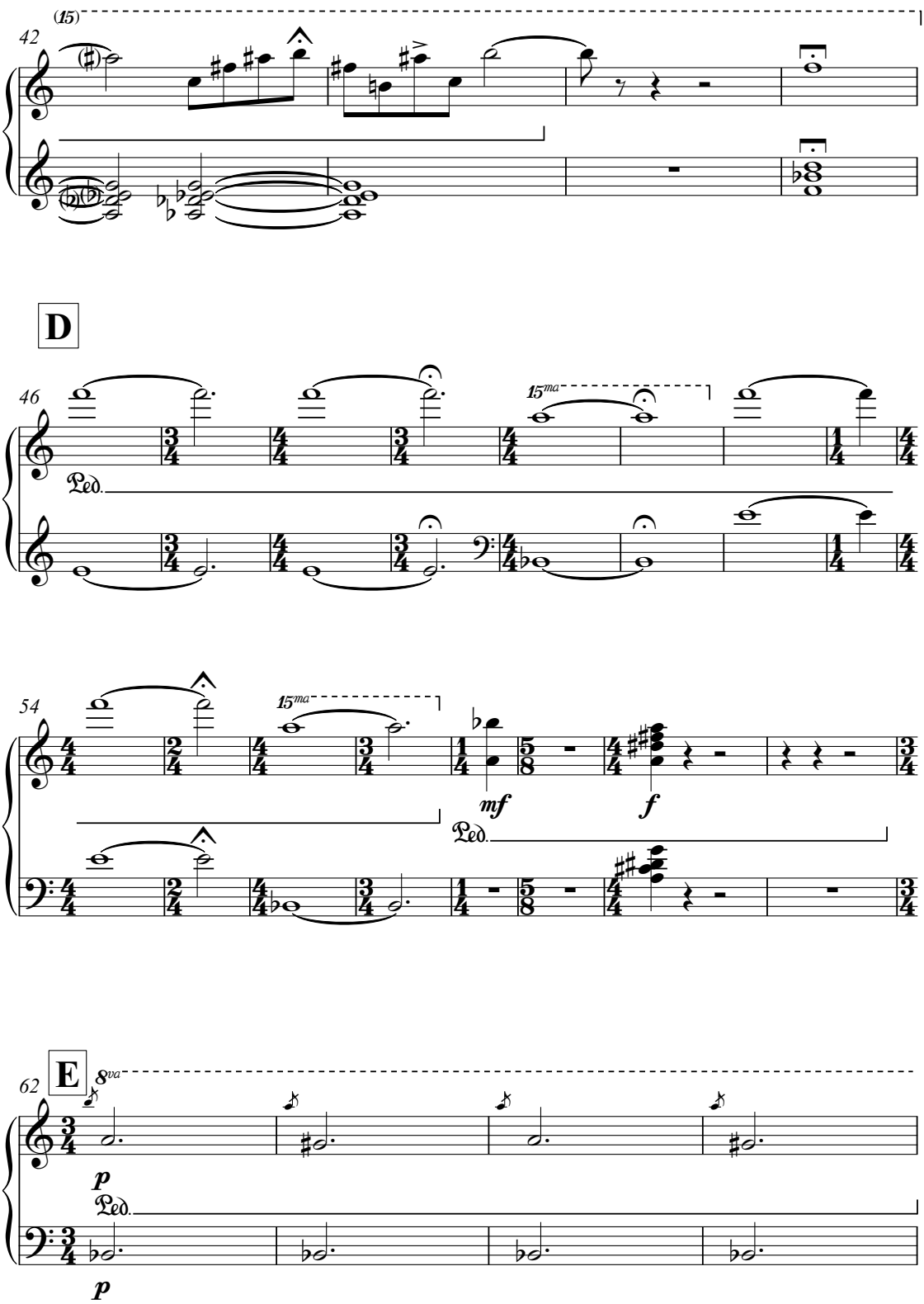
Ori Barel

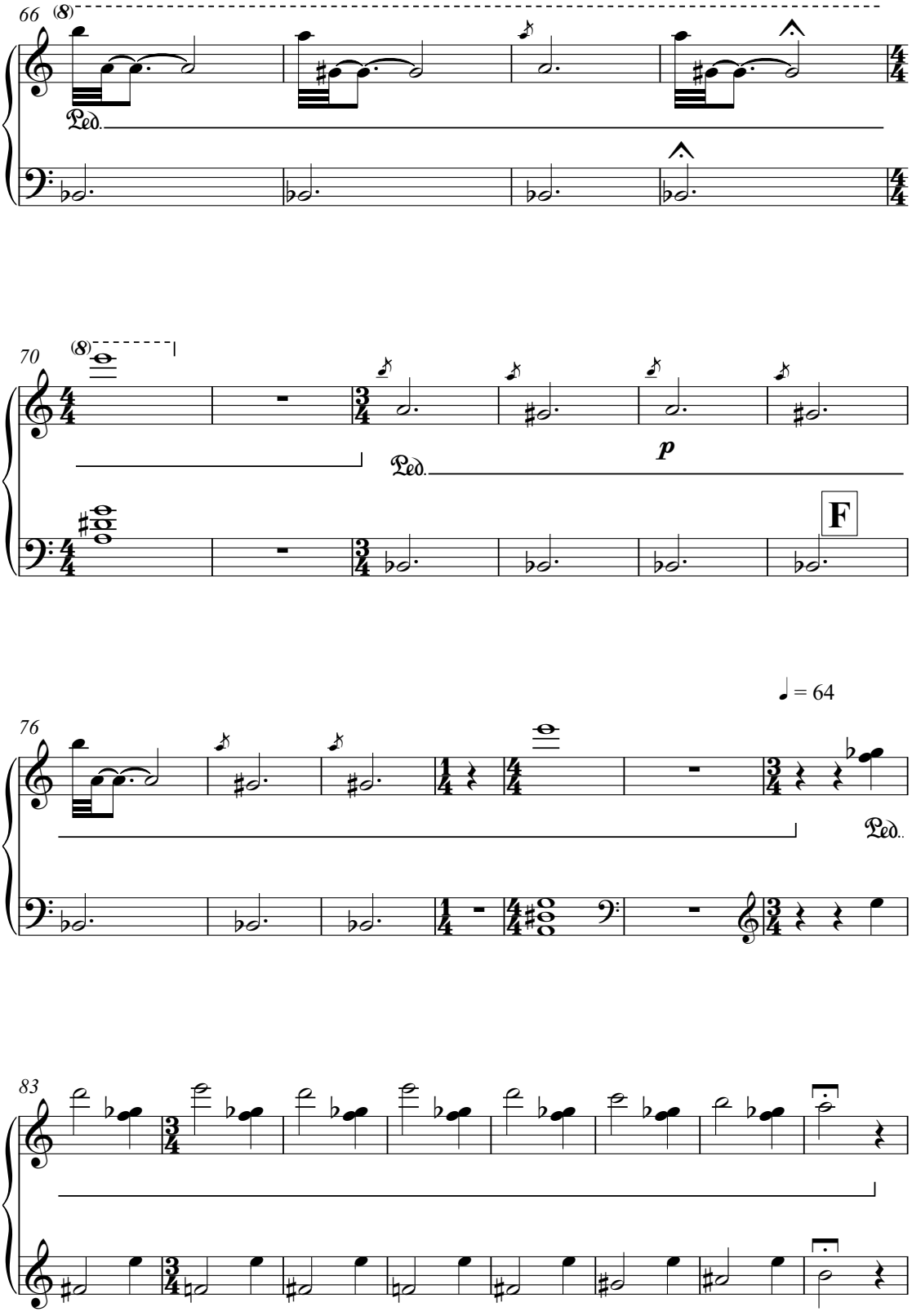


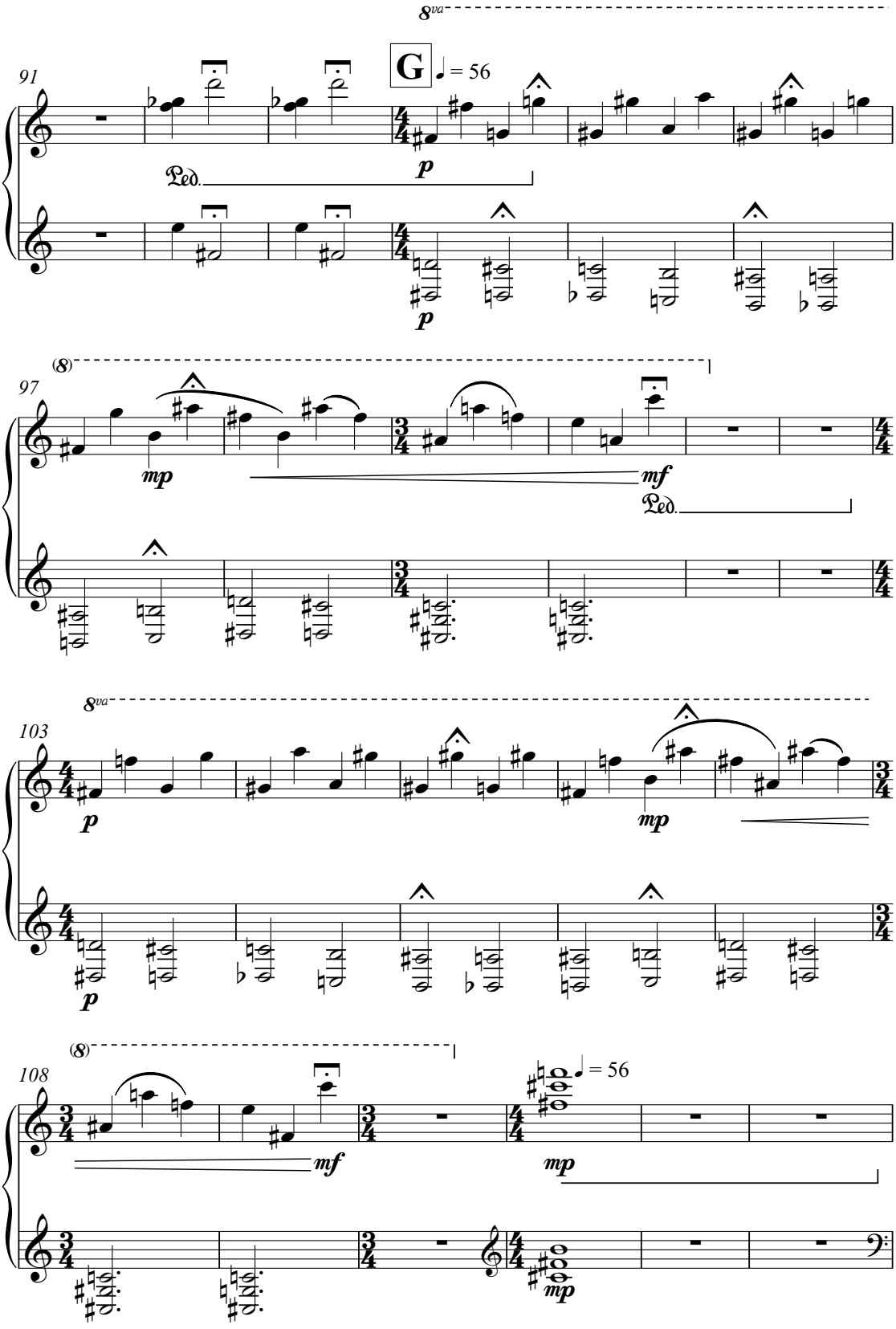

20
B
Ped.
Ped.
p
24
Ped.
p
Ped.
30
Ped.
p
pp
35
C
15ma
Ped.

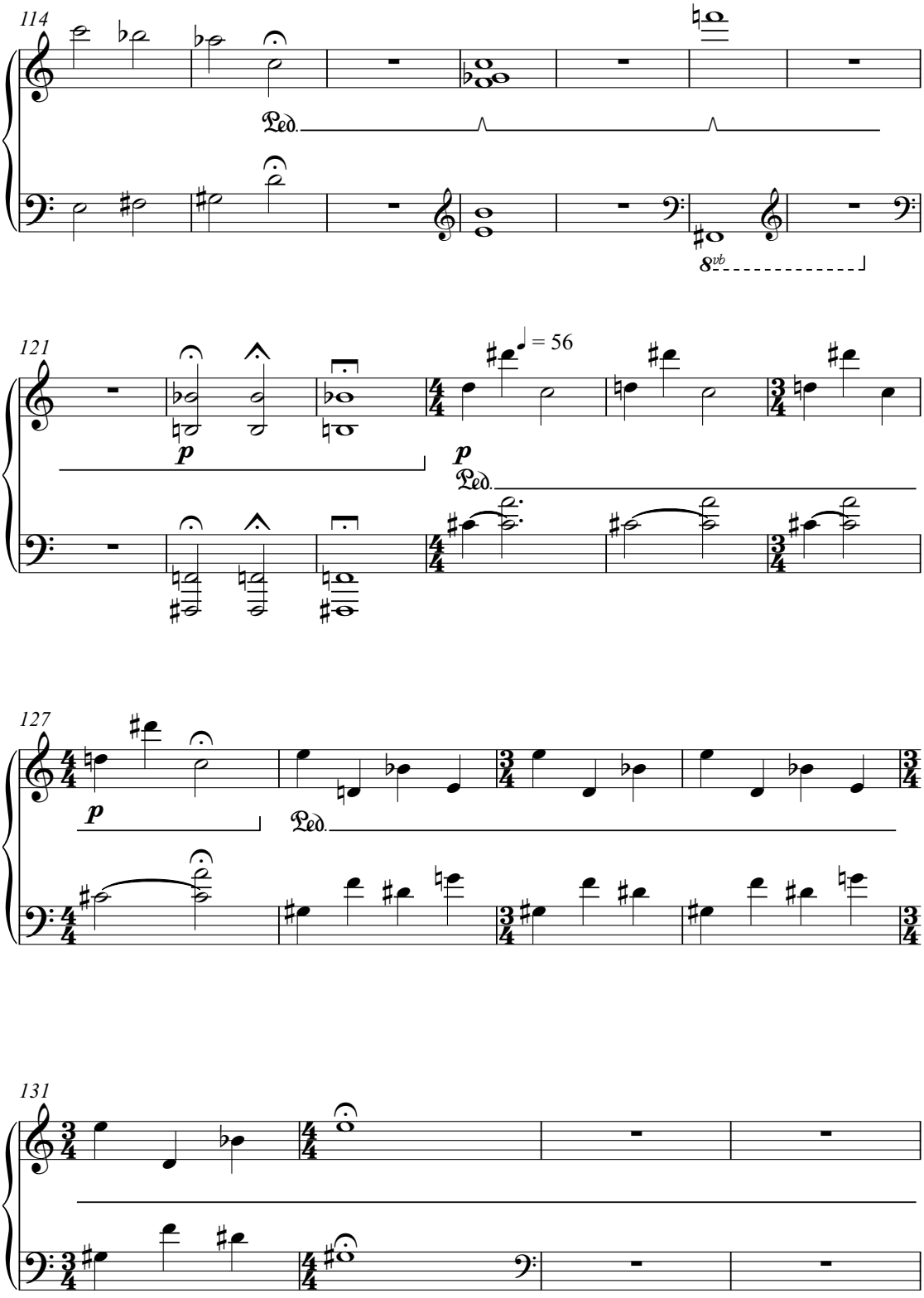
4

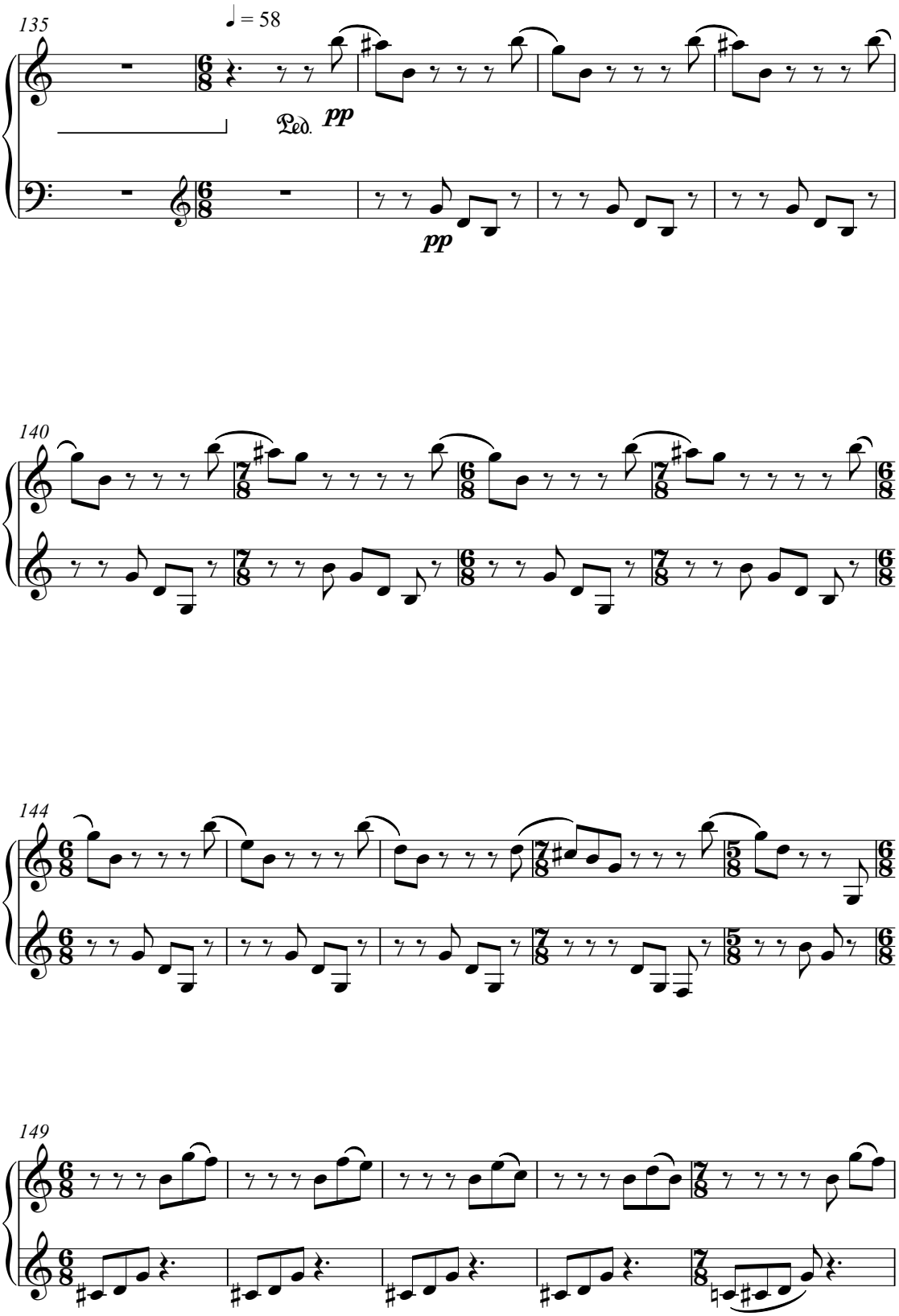



42
(15)
D
46
15ma
Ped.
54
15ma
mf
f
Ped.
62
E
8va
p
Ped.
p

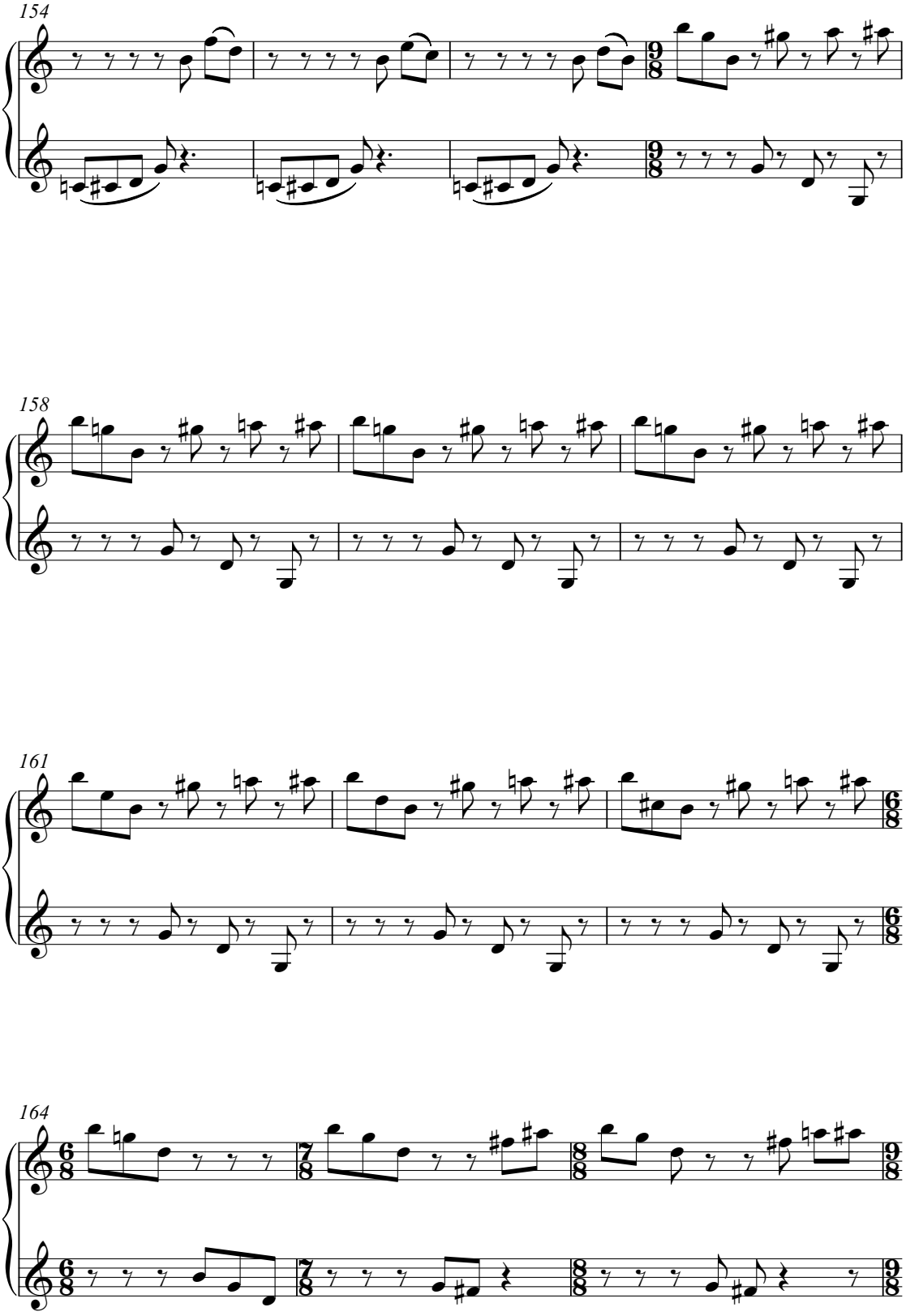

66
(8)
Ped.
70
(8)
p
Ped.
F
76
♩ = 64
Ped.
83

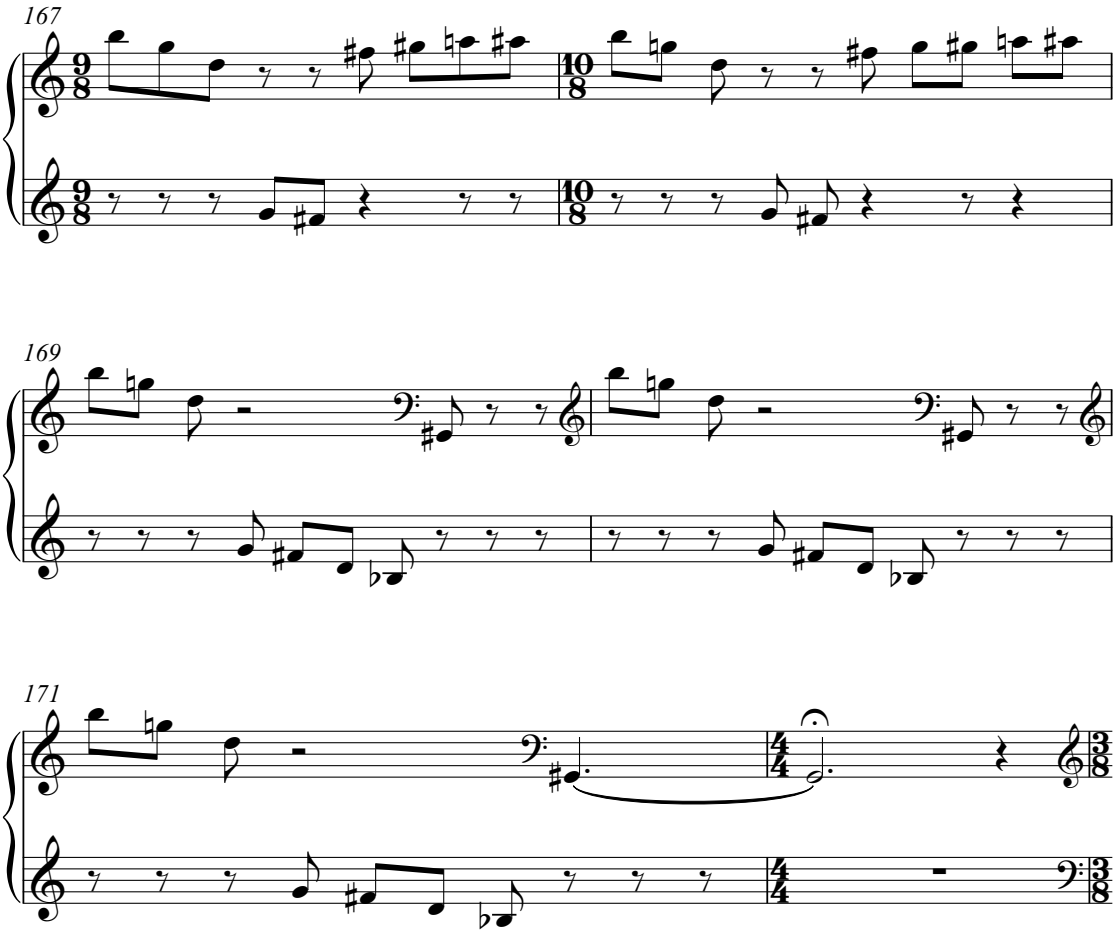

8va
91
G
♩ = 56
p
Ped.
p
(8)
97
mp
mf
Ped.
8va
103
p
mp
p
(8)
108
mf
♩ = 56
mp
mp


114
Ped.
8vb
121
♩ = 56
p
p
Ped.
127
p
Ped.
131


135
♩ = 58
Ped.
pp
pp
140
144
149

10

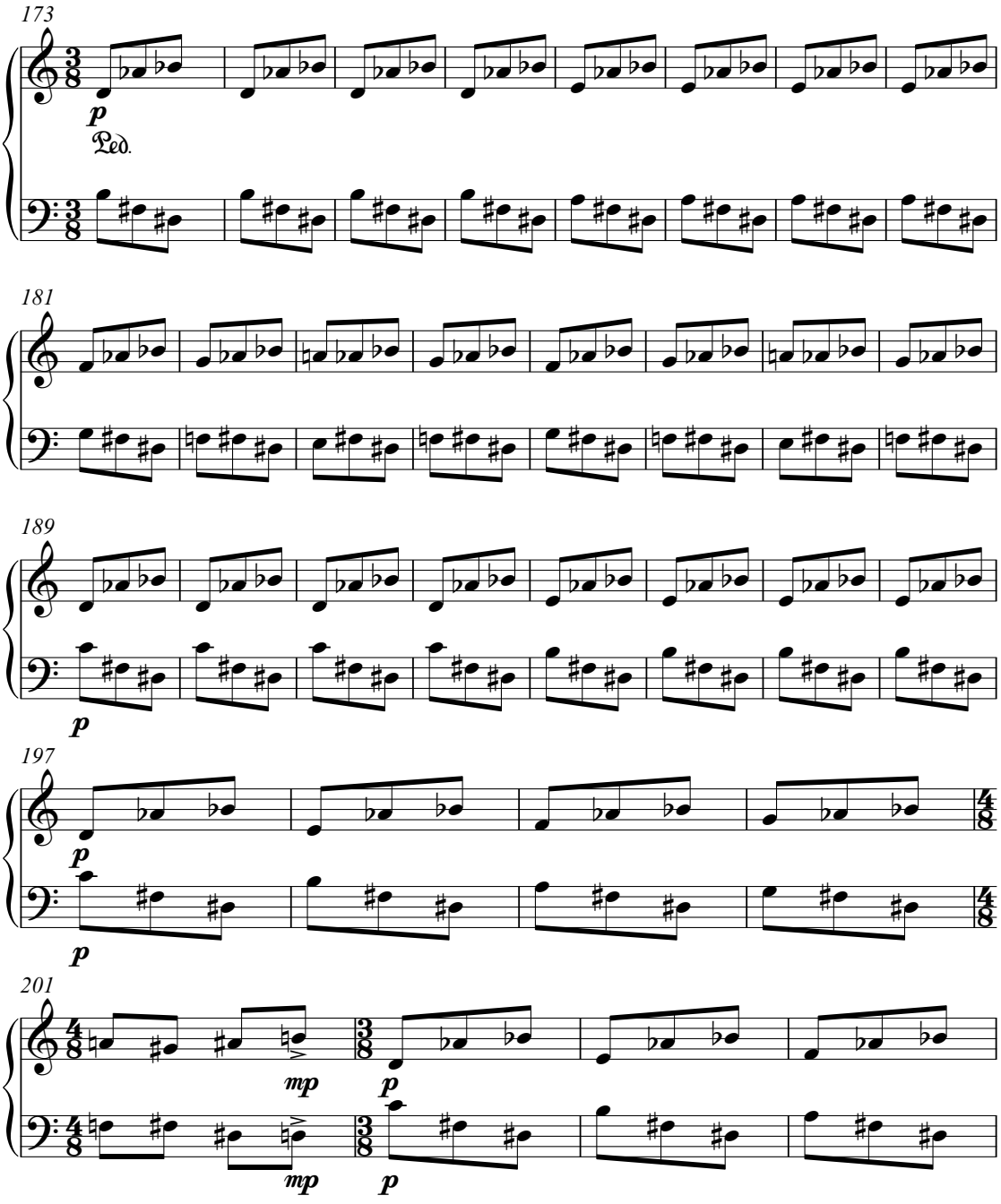


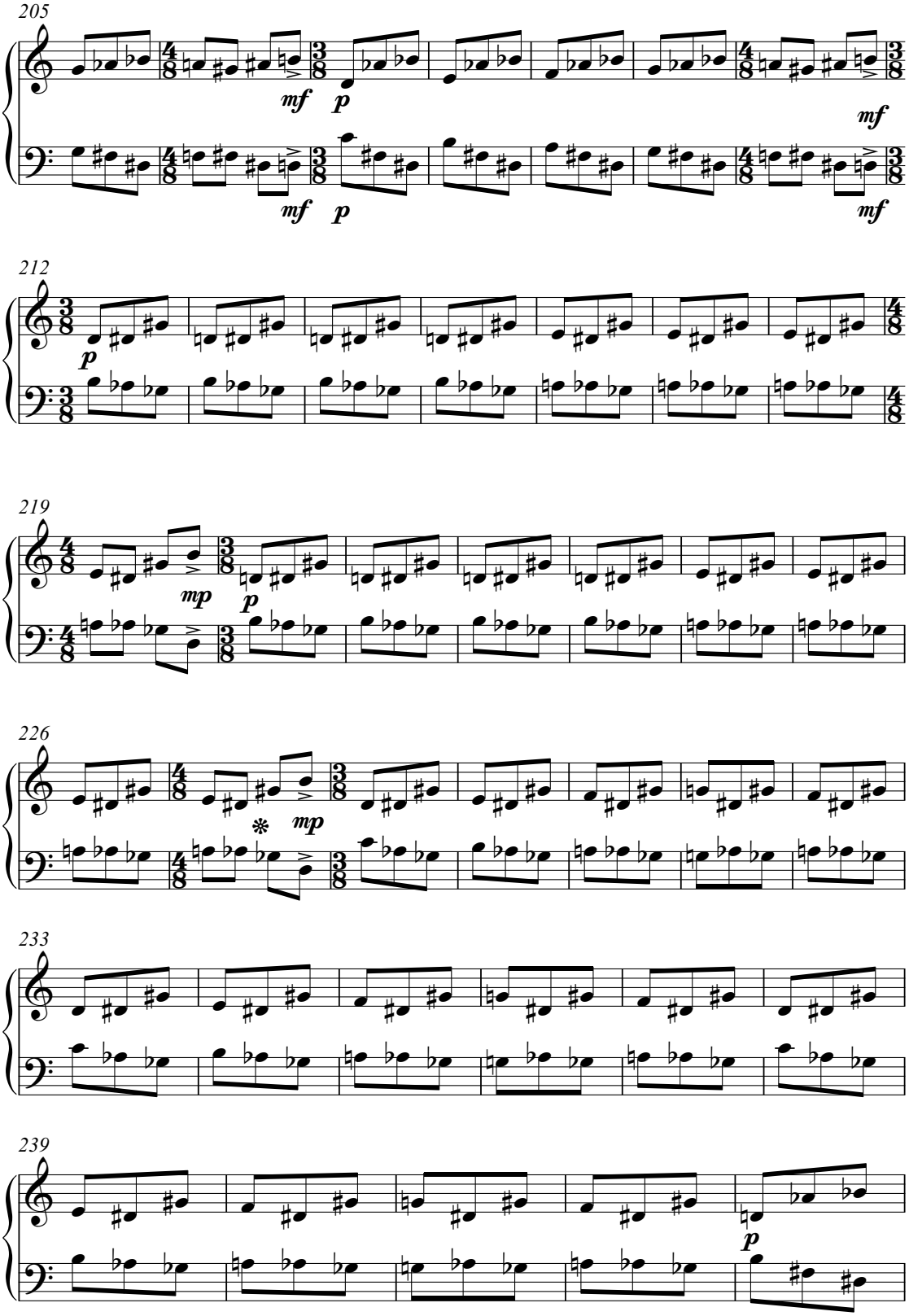

167
169
171

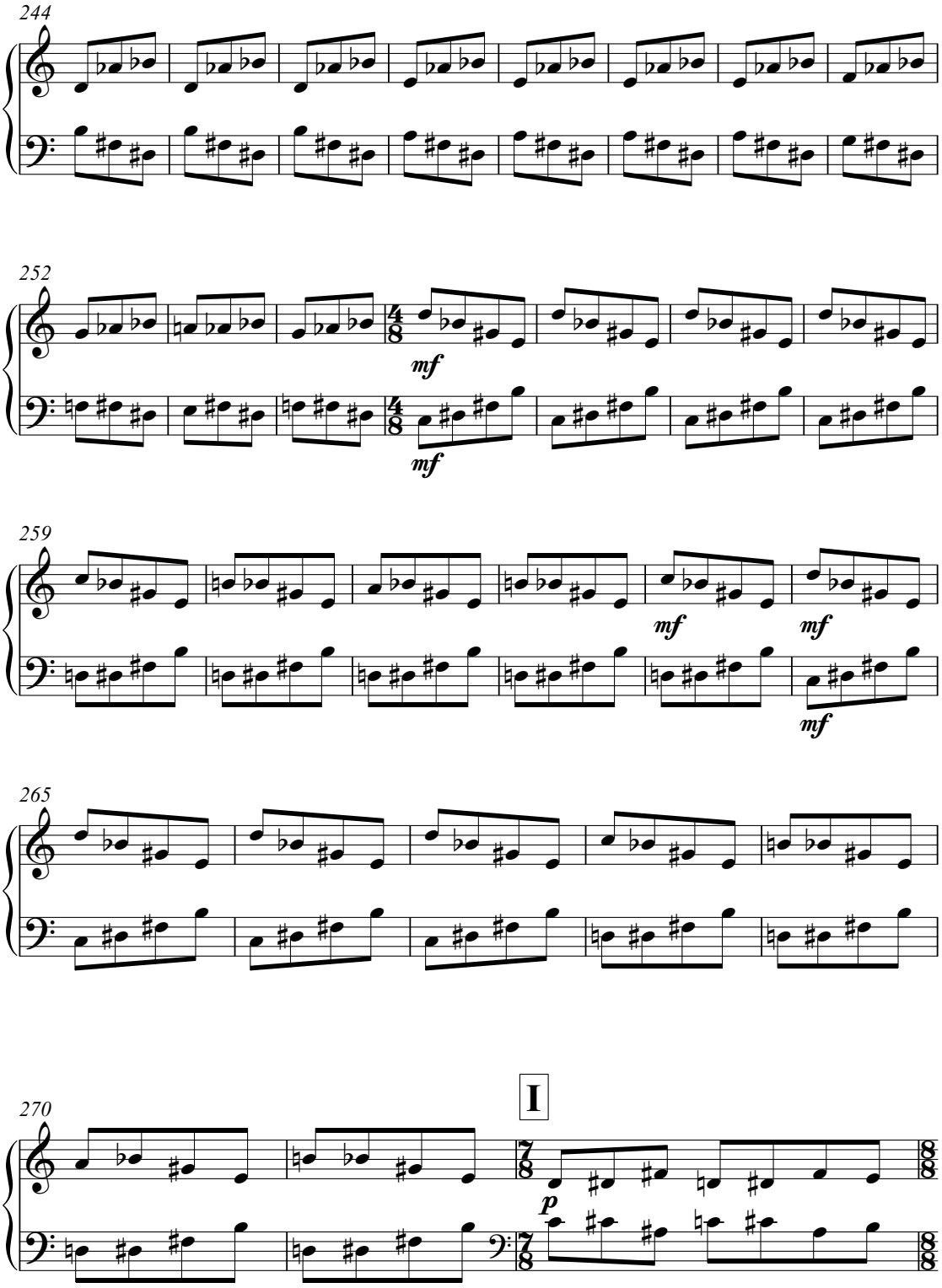
II. Mirror I

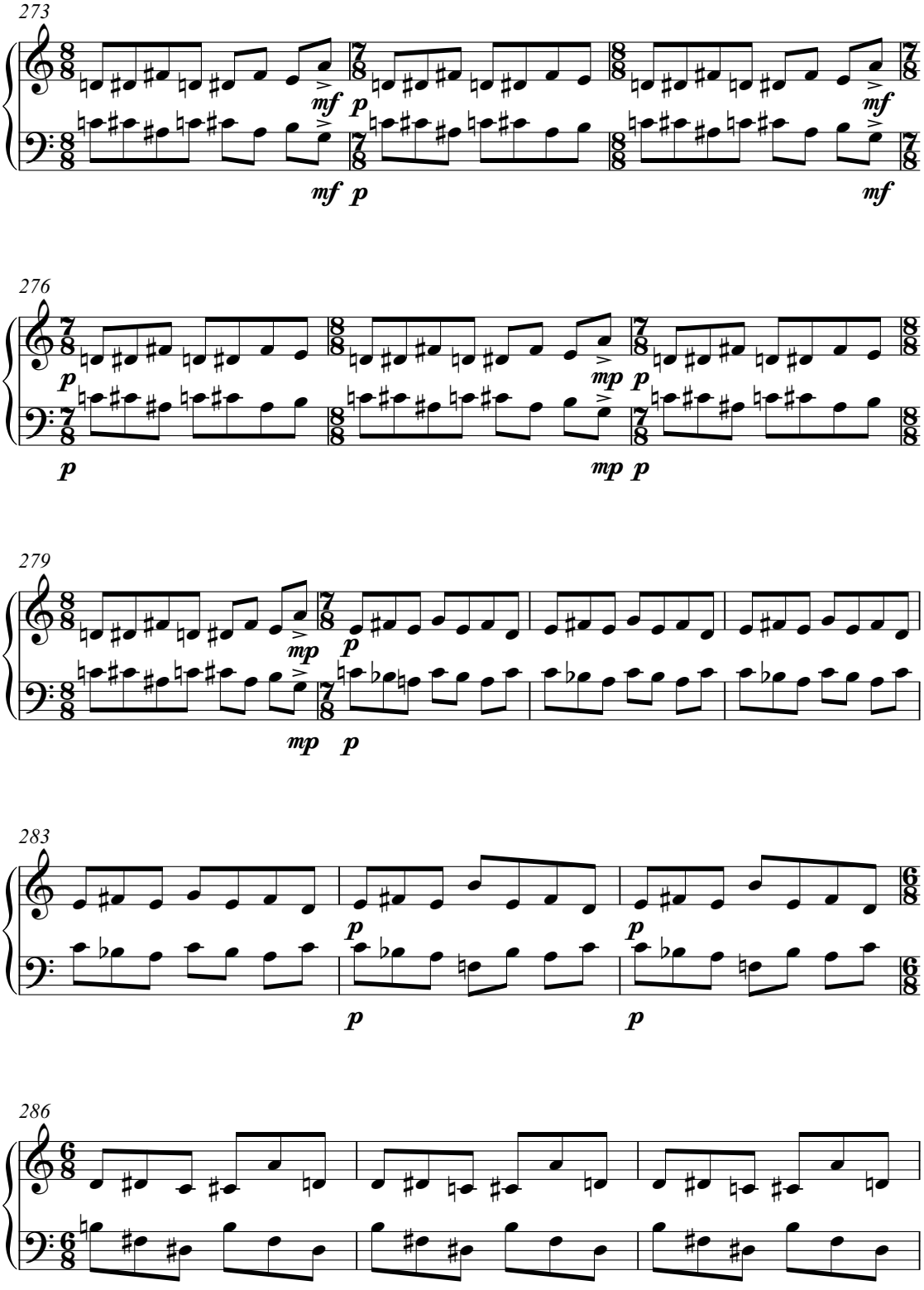
Even, Calm, Dreaming, floating, Light, Clouds
Not expressive but not dry either, bordering between melody and harmony
Avoiding definition of form, never dramatic, always listening to timbre

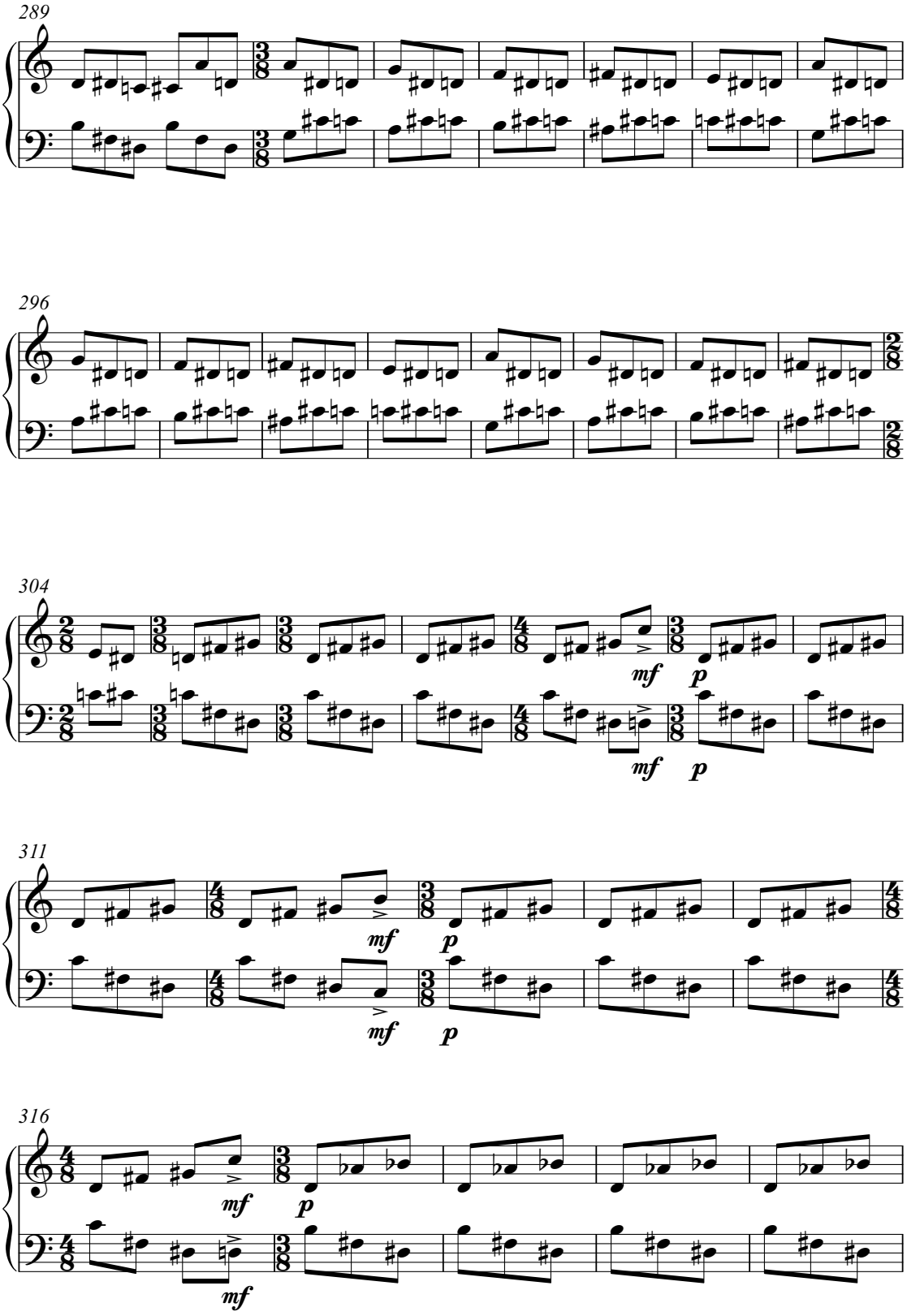
H ♩. = 54



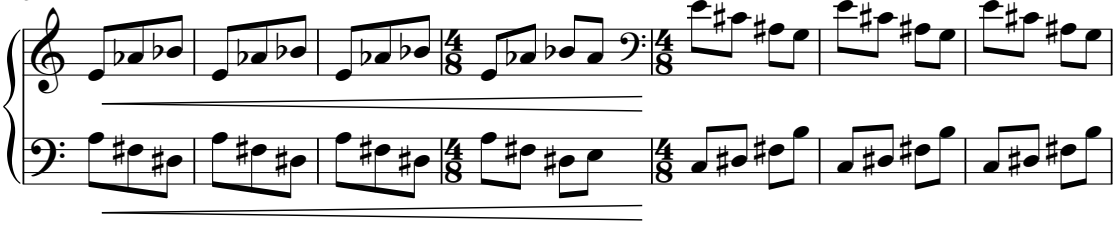

205
mf
p
mf
mf
p
mf
212
p
219
mp
p
226
mp
233
239
p


244
252
mf
mf
259
mf
mf
mf
265
270
I
p

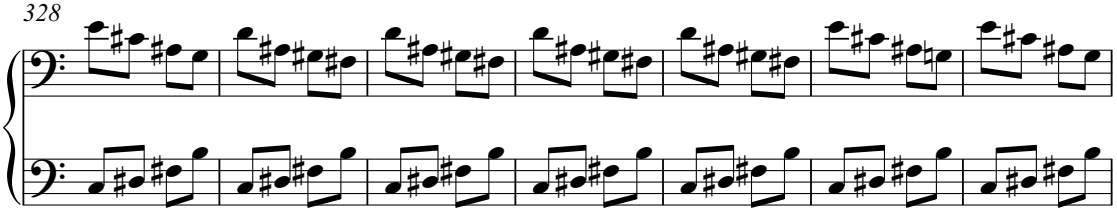

273
mf
p
mf p
mf
276
p
p
mp
mp p
279
mp
mp
p
283
p
p
p
p
286


289
296
304
311
316
mf
p

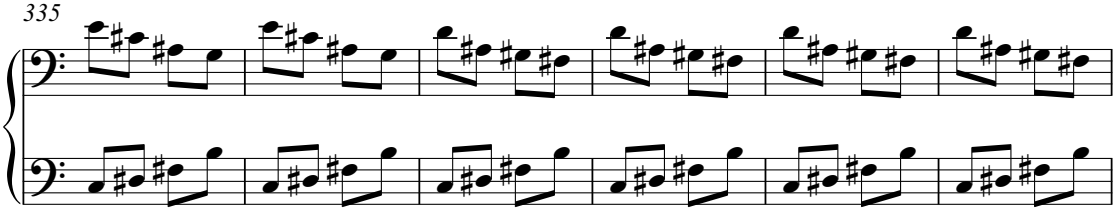
321



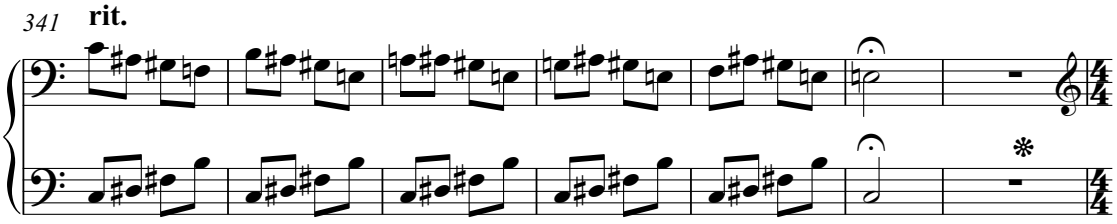
328



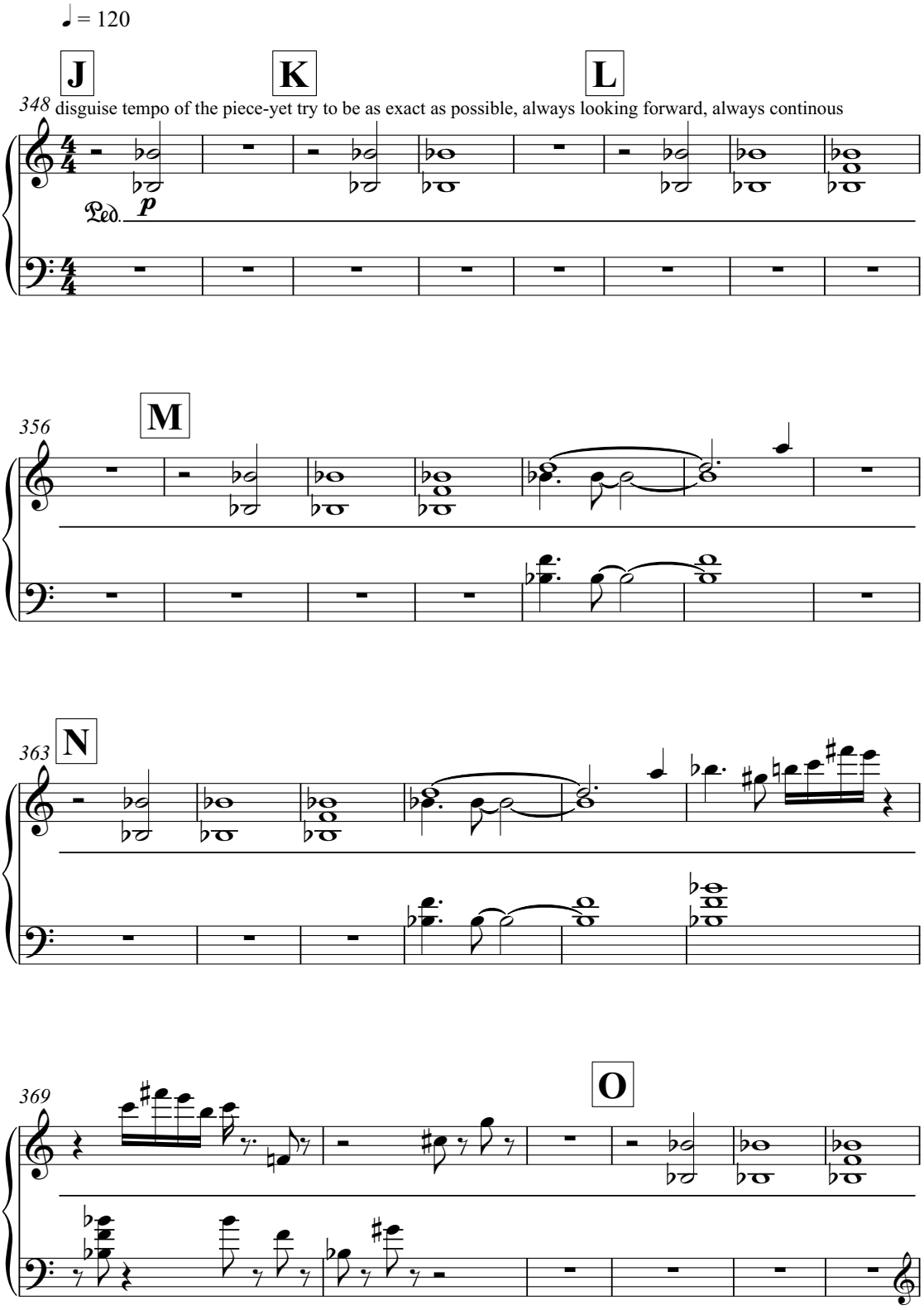
335

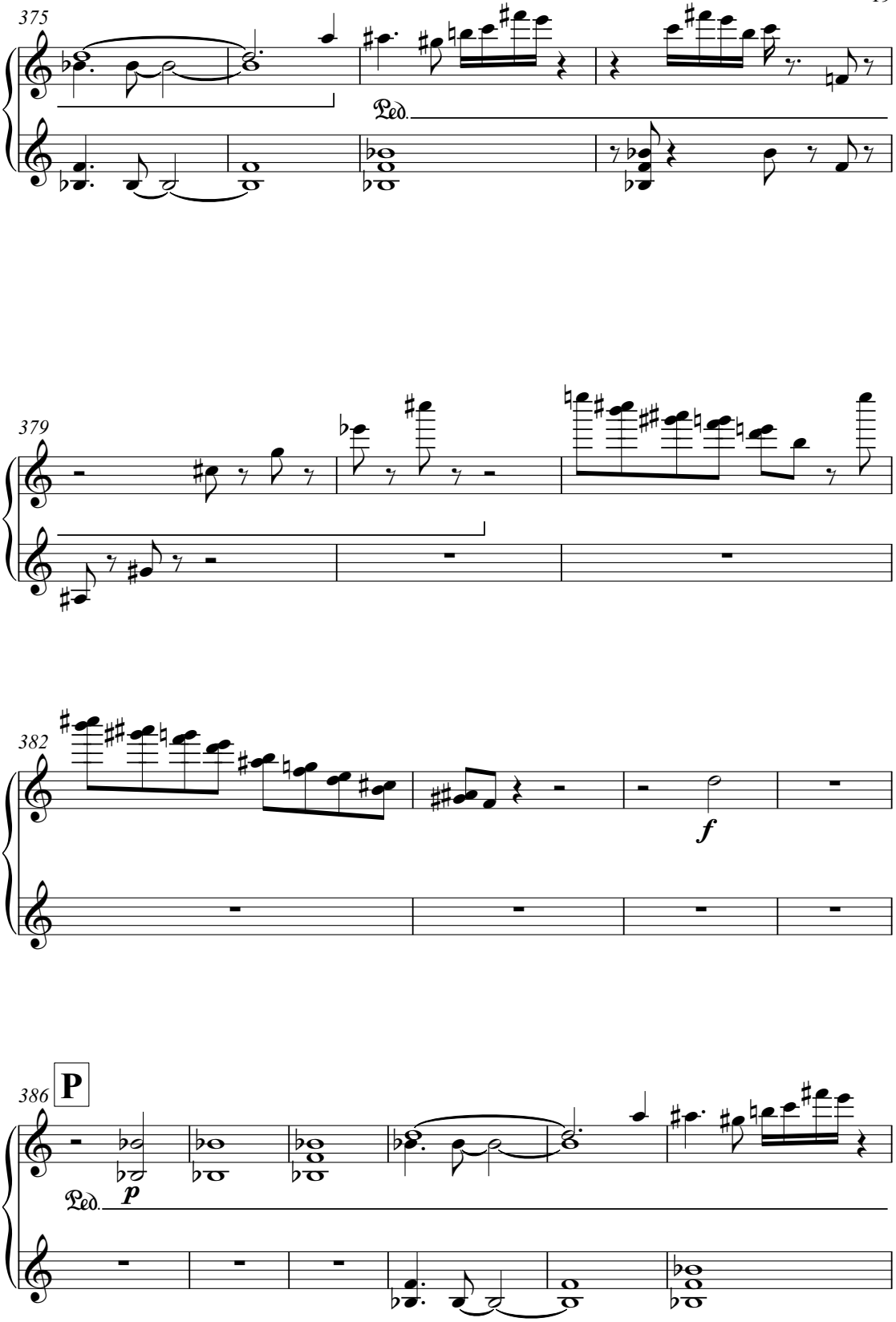


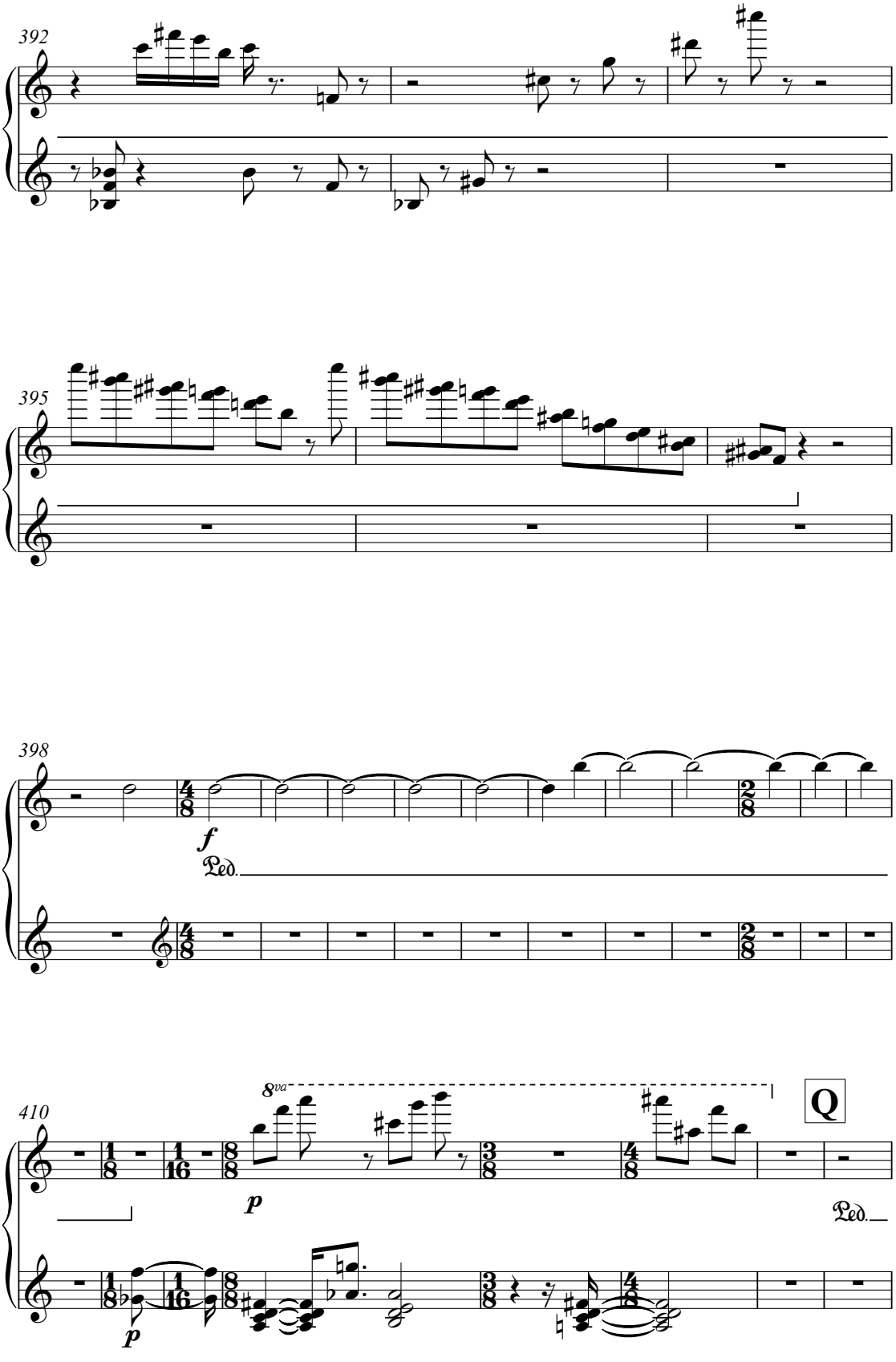
341 **rit.**

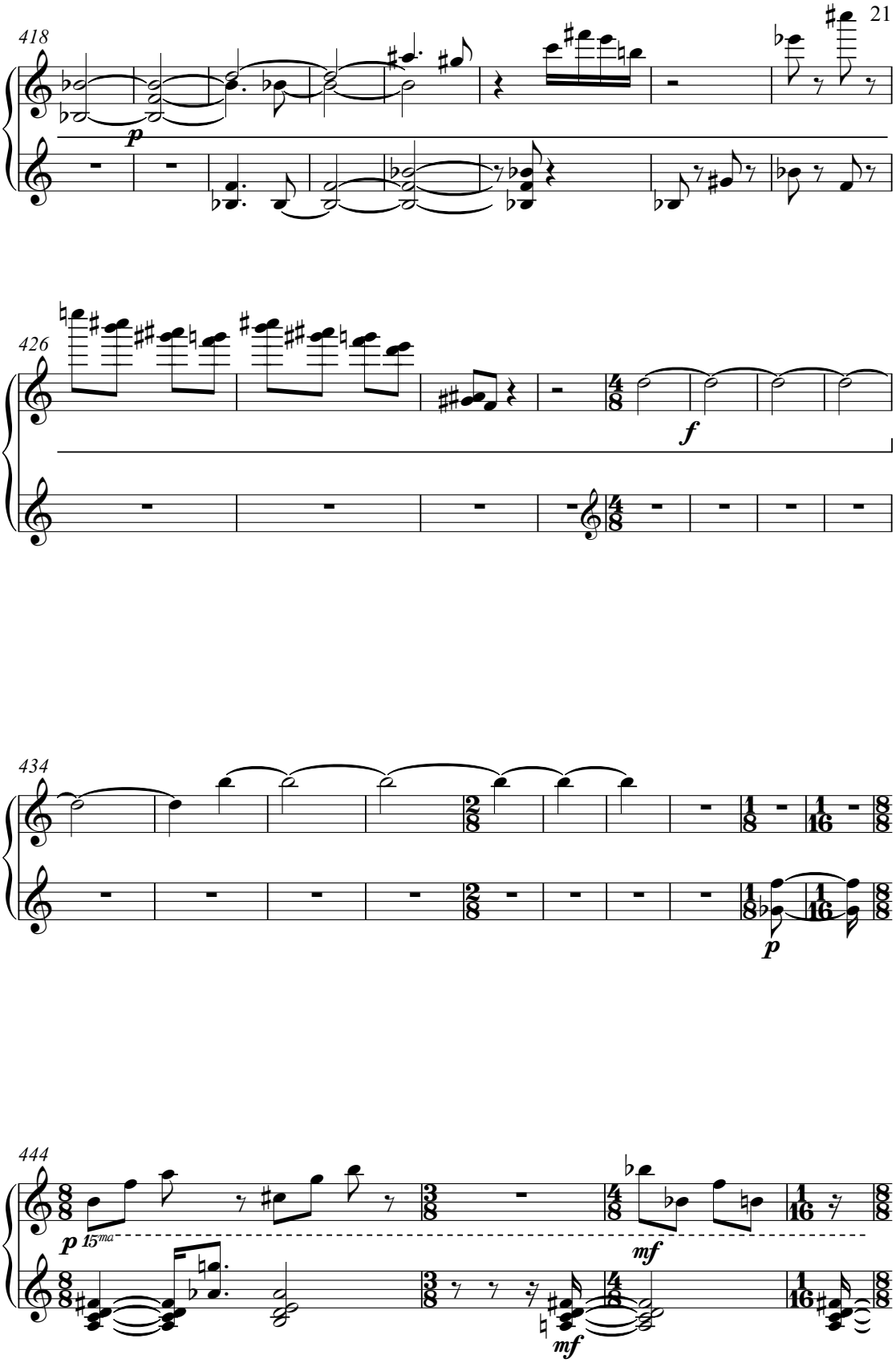


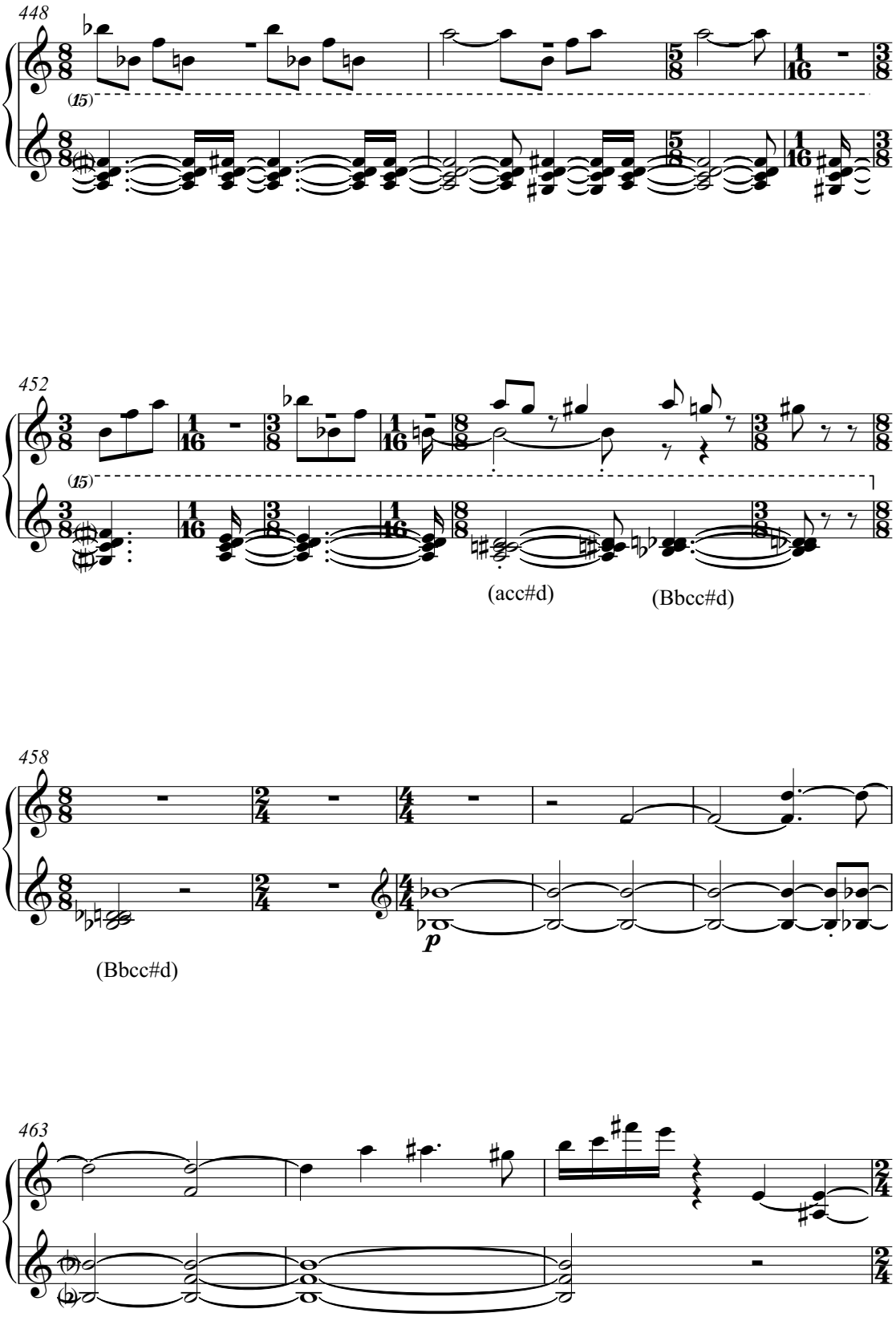
III. Fibonnaci Memory I

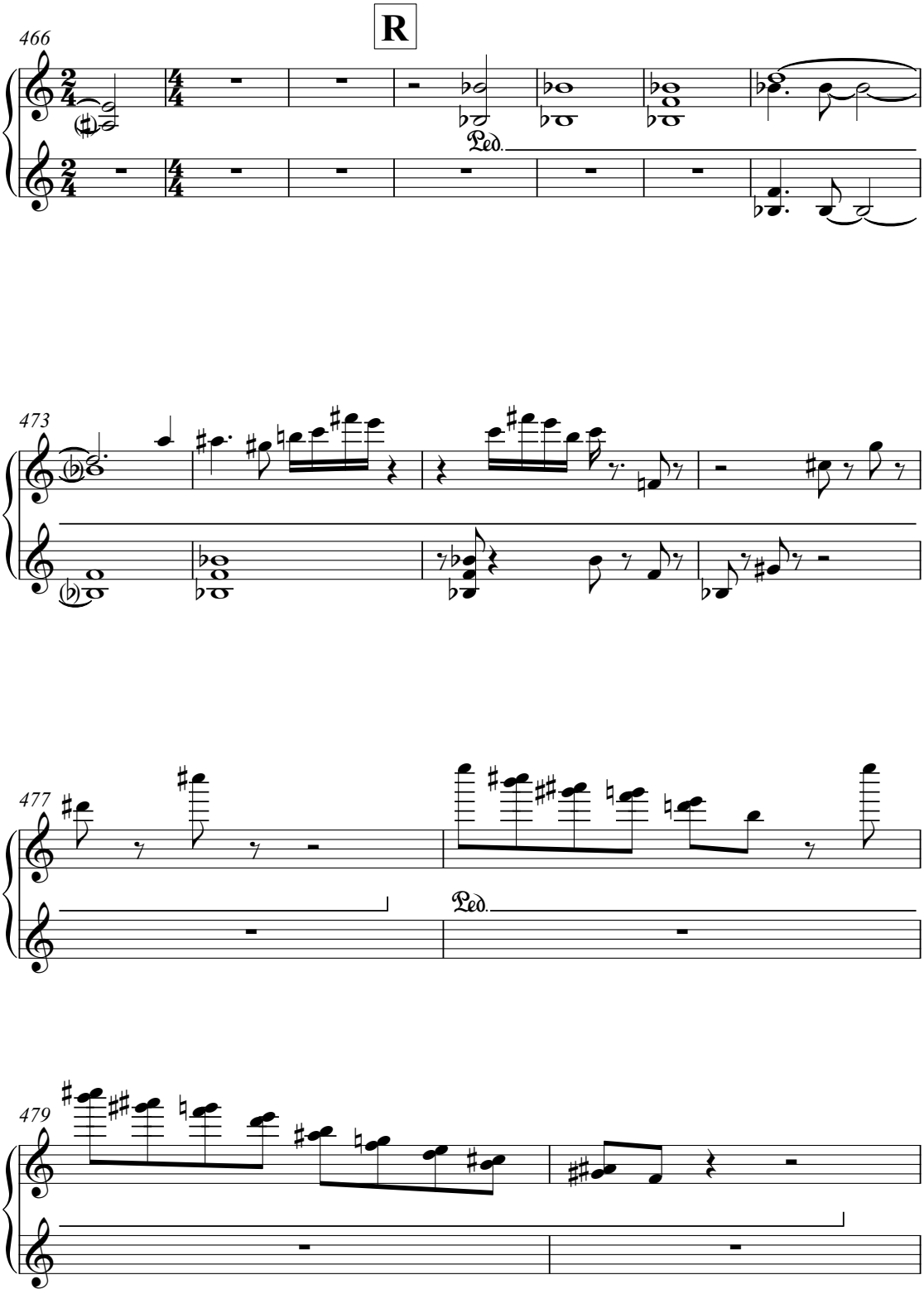


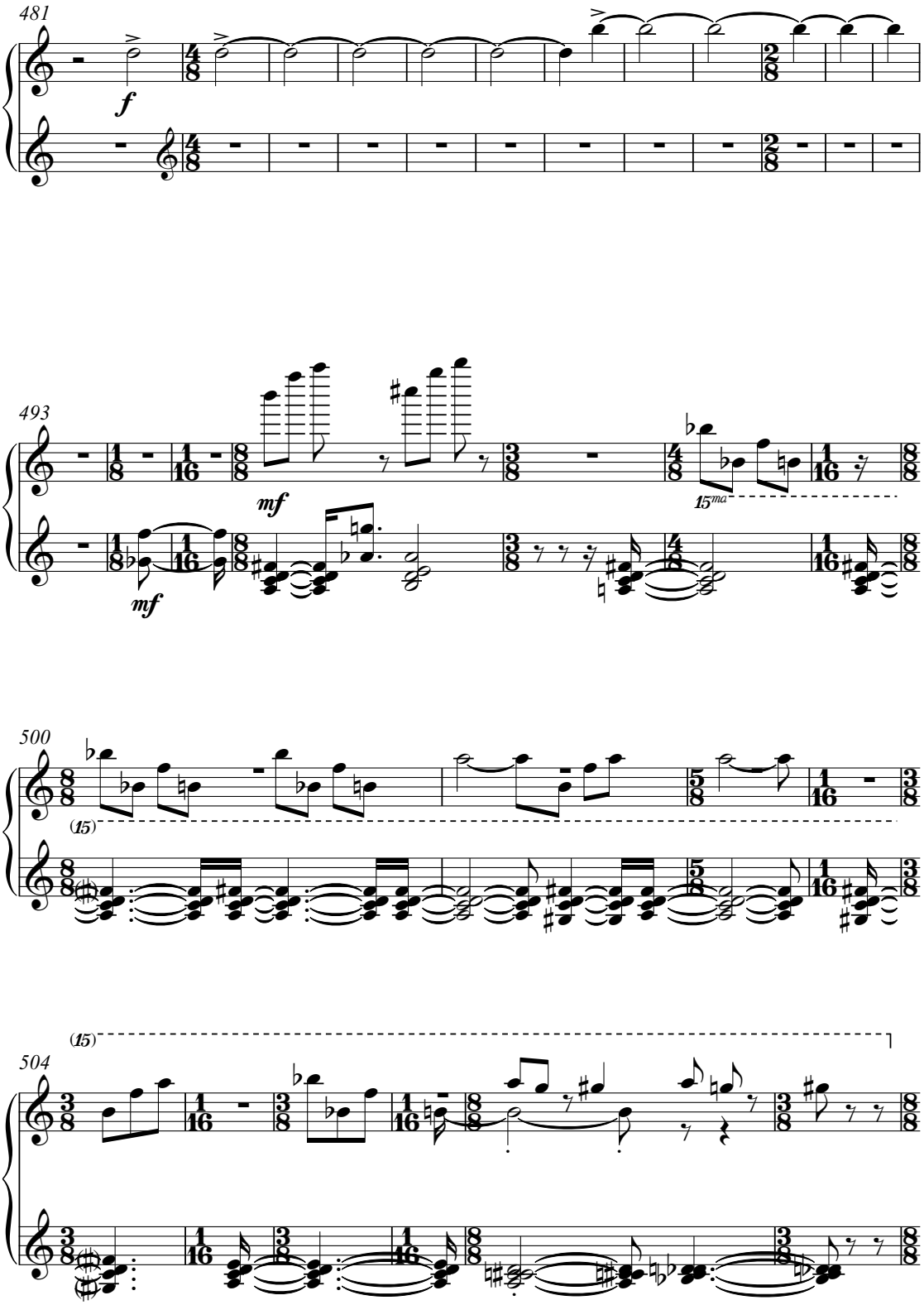

375
Ped.
379
382
f
386
P
p
Ped.

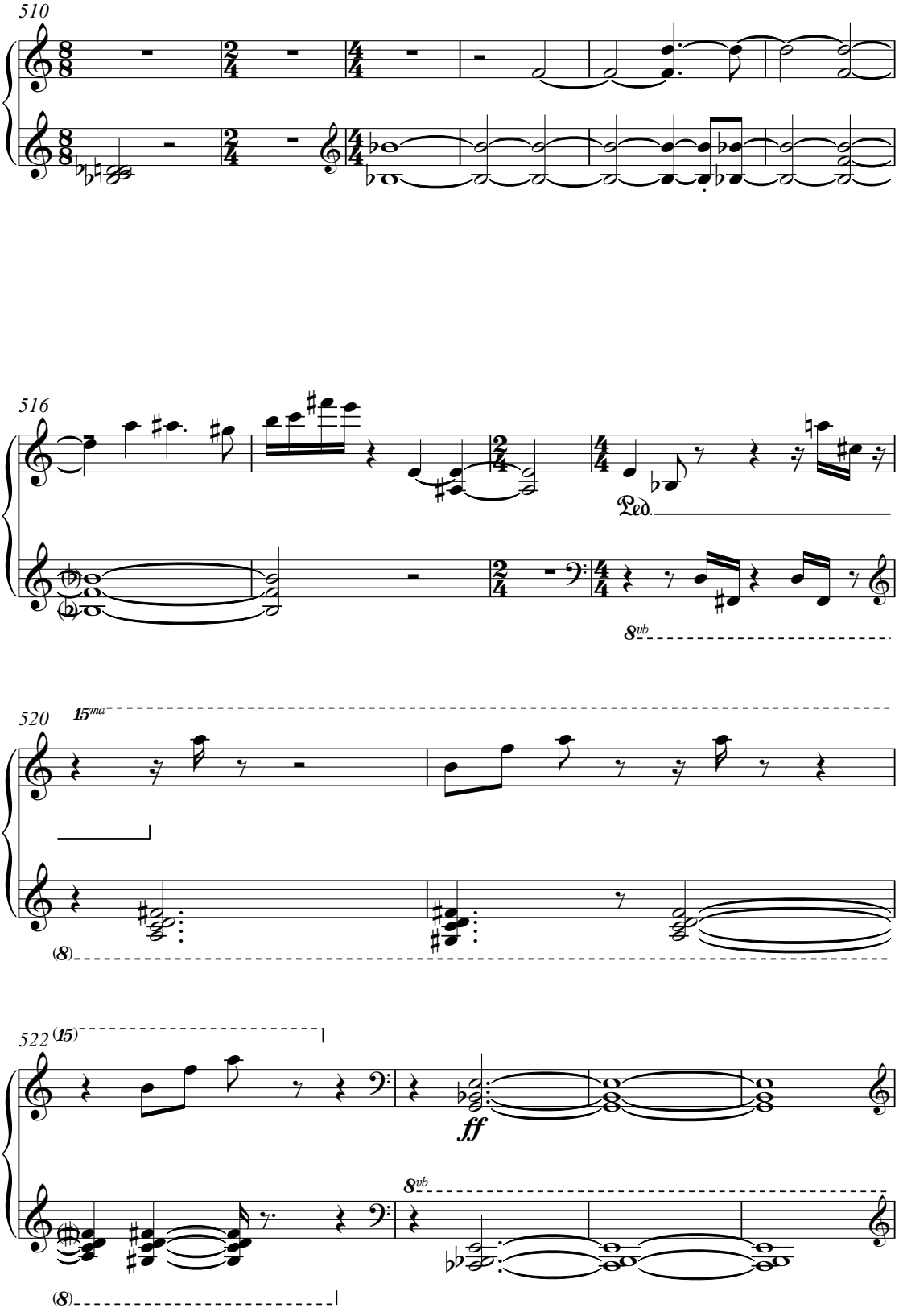

392
395
398
f
Ped.
410
8va
p
Q
Ped.
p

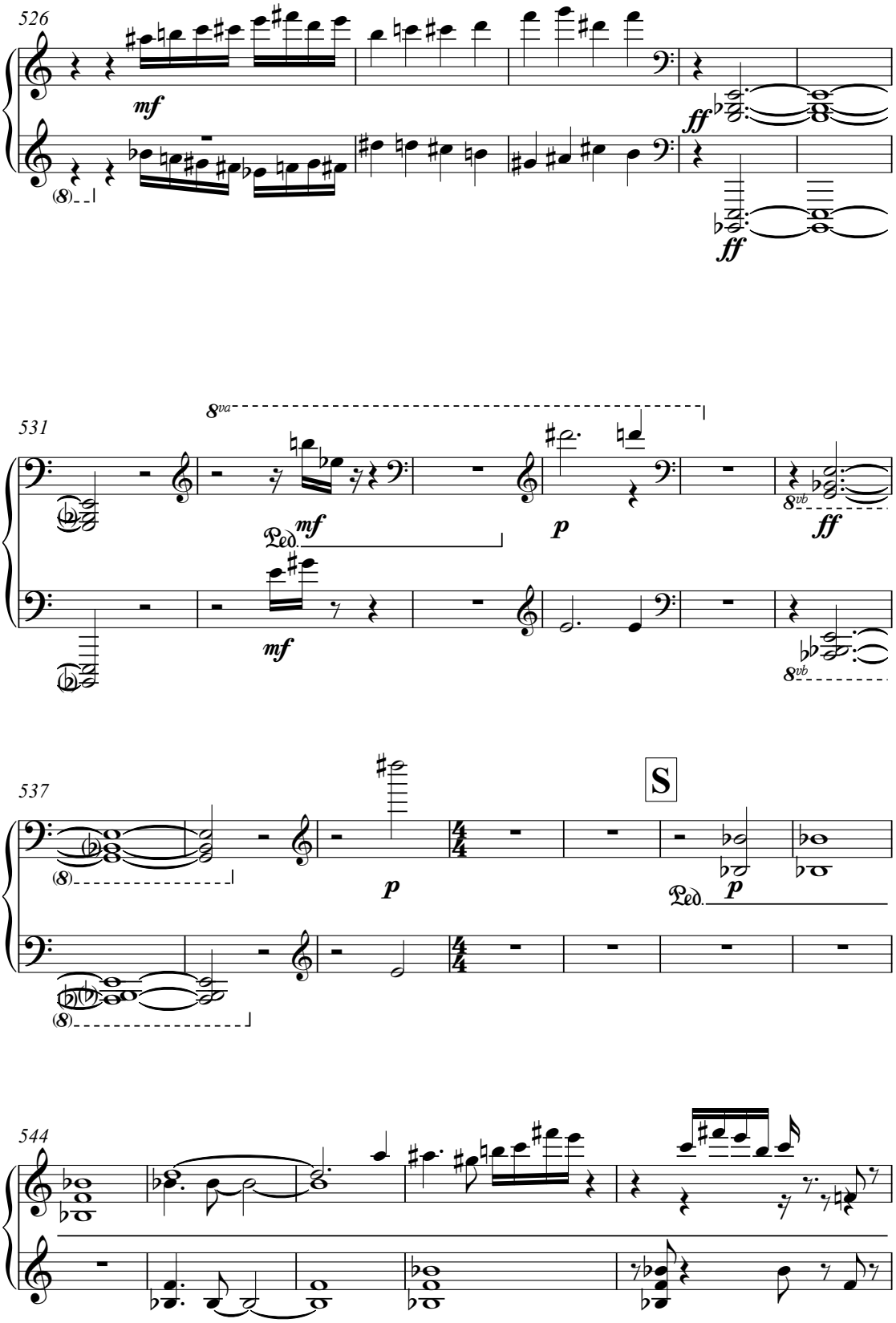

418
p
426
f
434
p
444
p
15ma
mf
mf

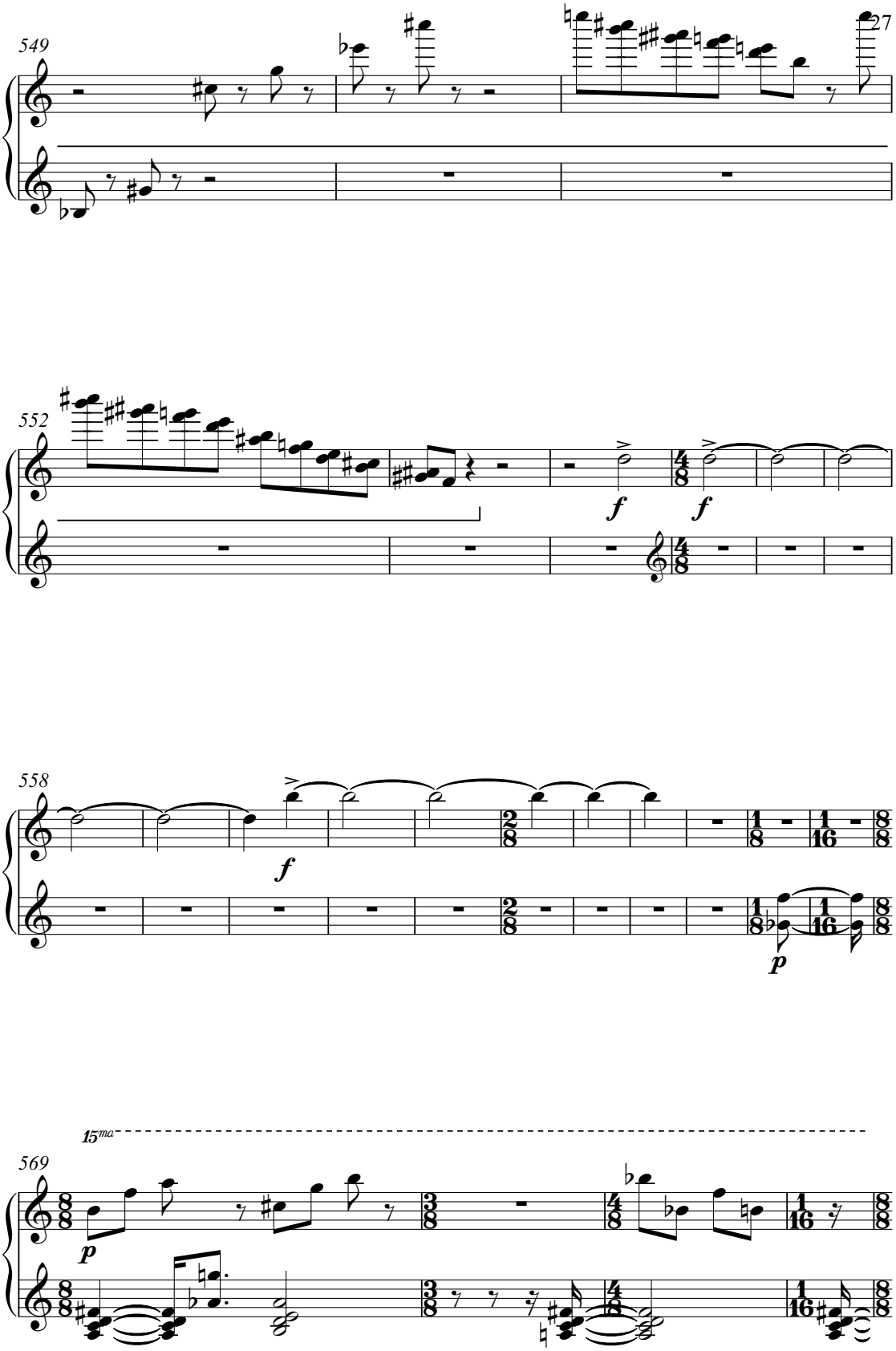

448
452
(acc#d)
(Bbcc#d)
458
(Bbcc#d)
463

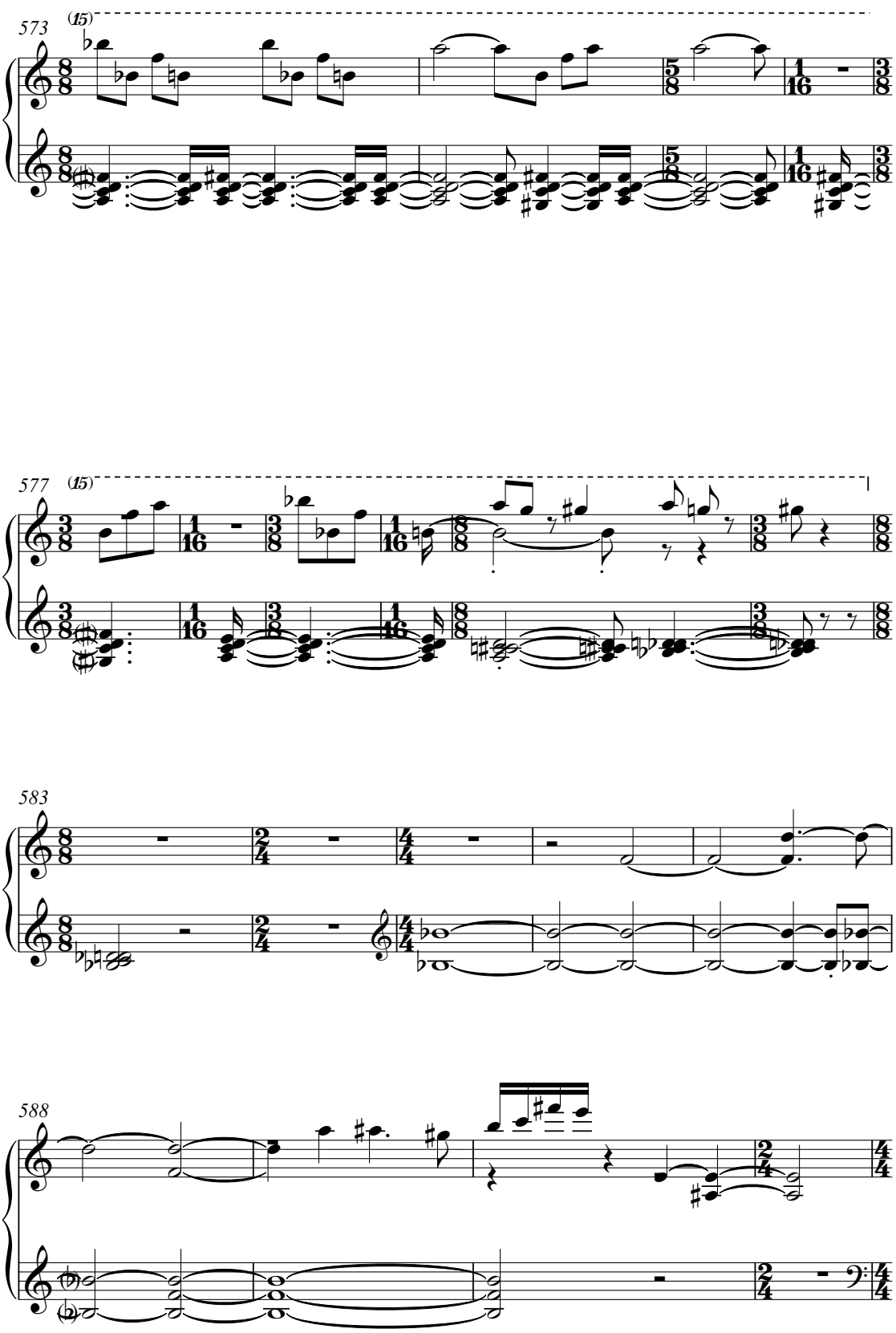

R
466
Ped.
473
477
Ped.
479

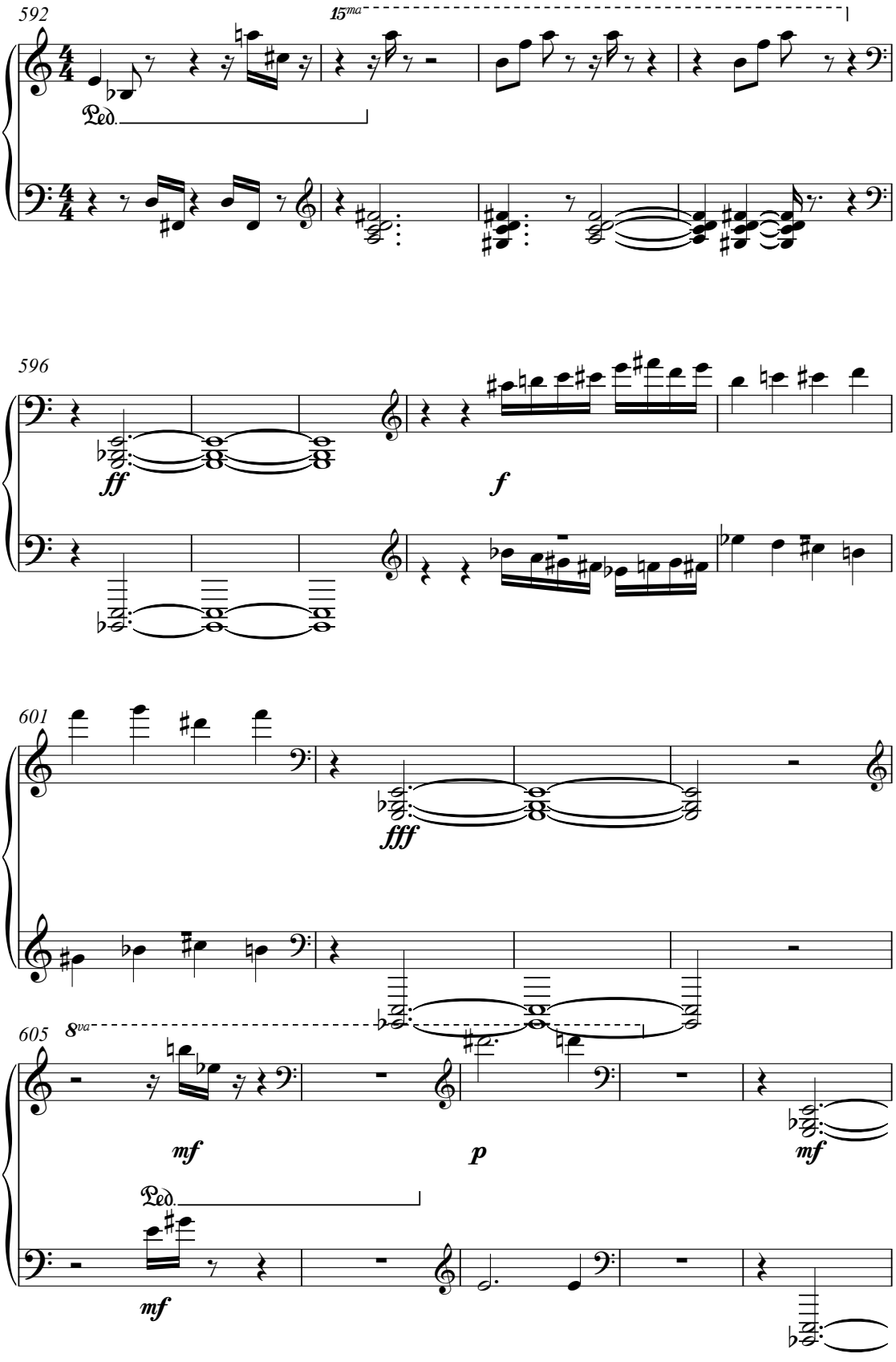

481
f
493
mf
mf
15ma
500
(15)
504
(15)

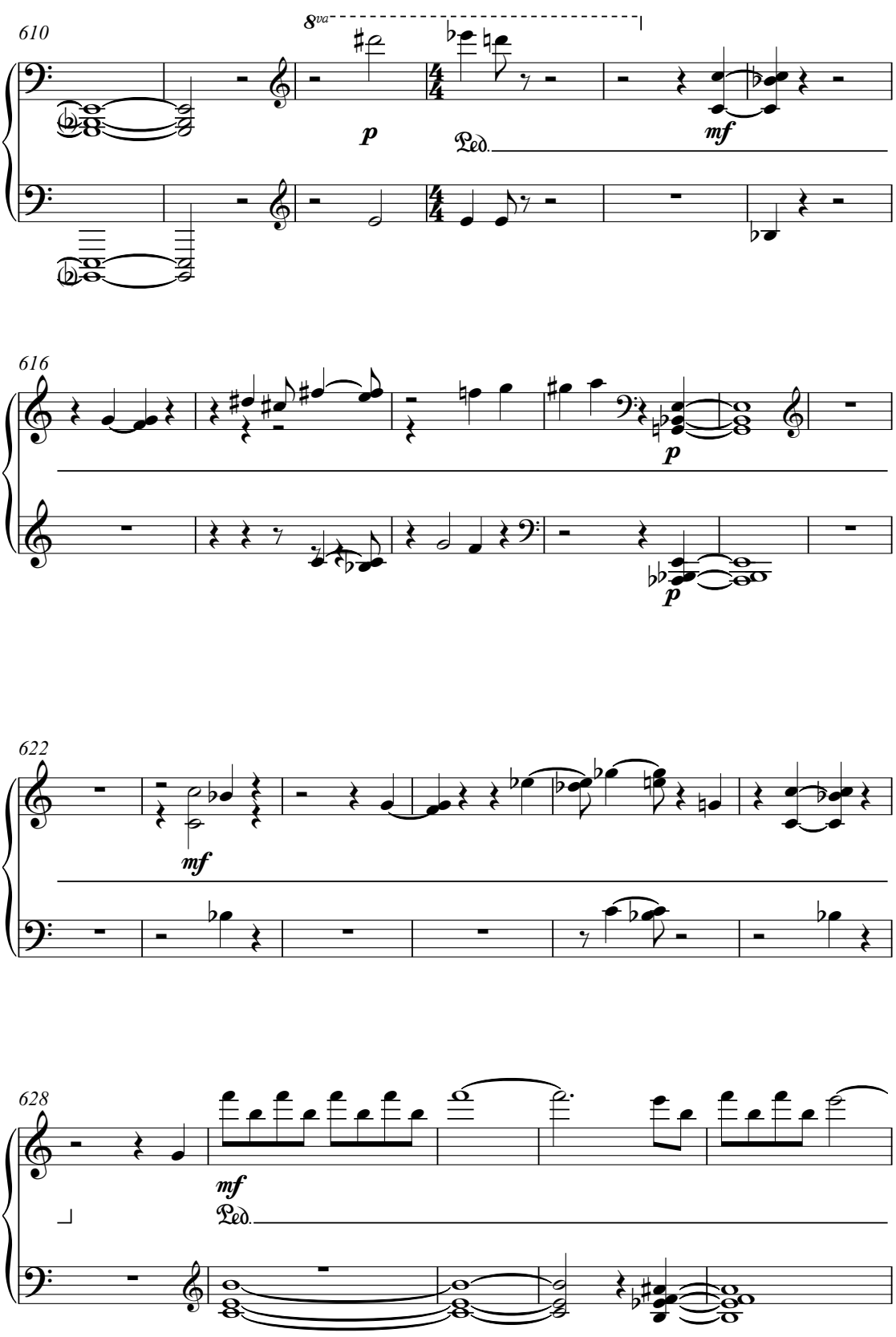

510
516
Ped.
8vb
520
15ma
(8)
522
(15)
ff
8vb
(8)

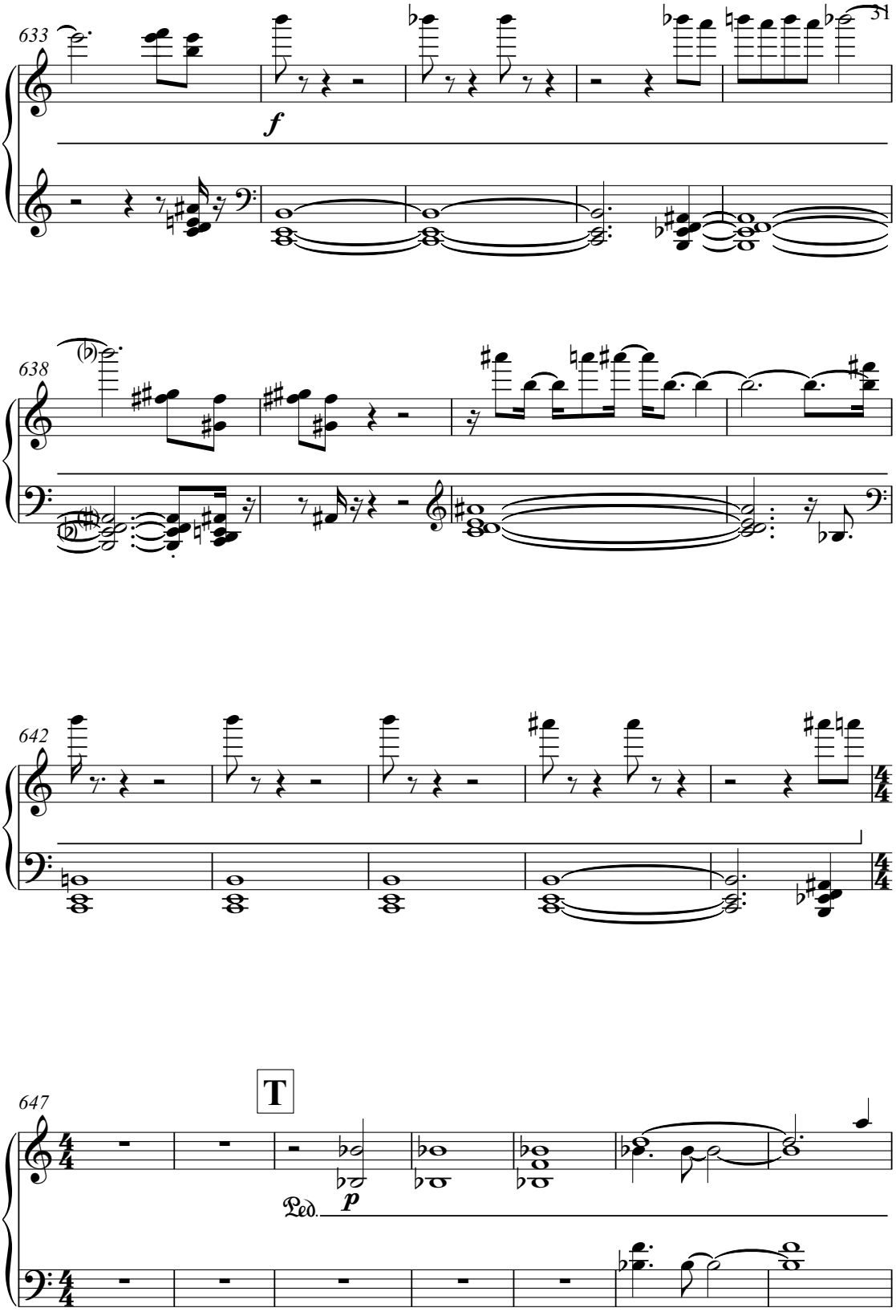

526
mf
ff
ff
531
8va
mf
Ped.
mf
p
8vb
ff
mf
8vb
537
S
p
Ped.
p
544

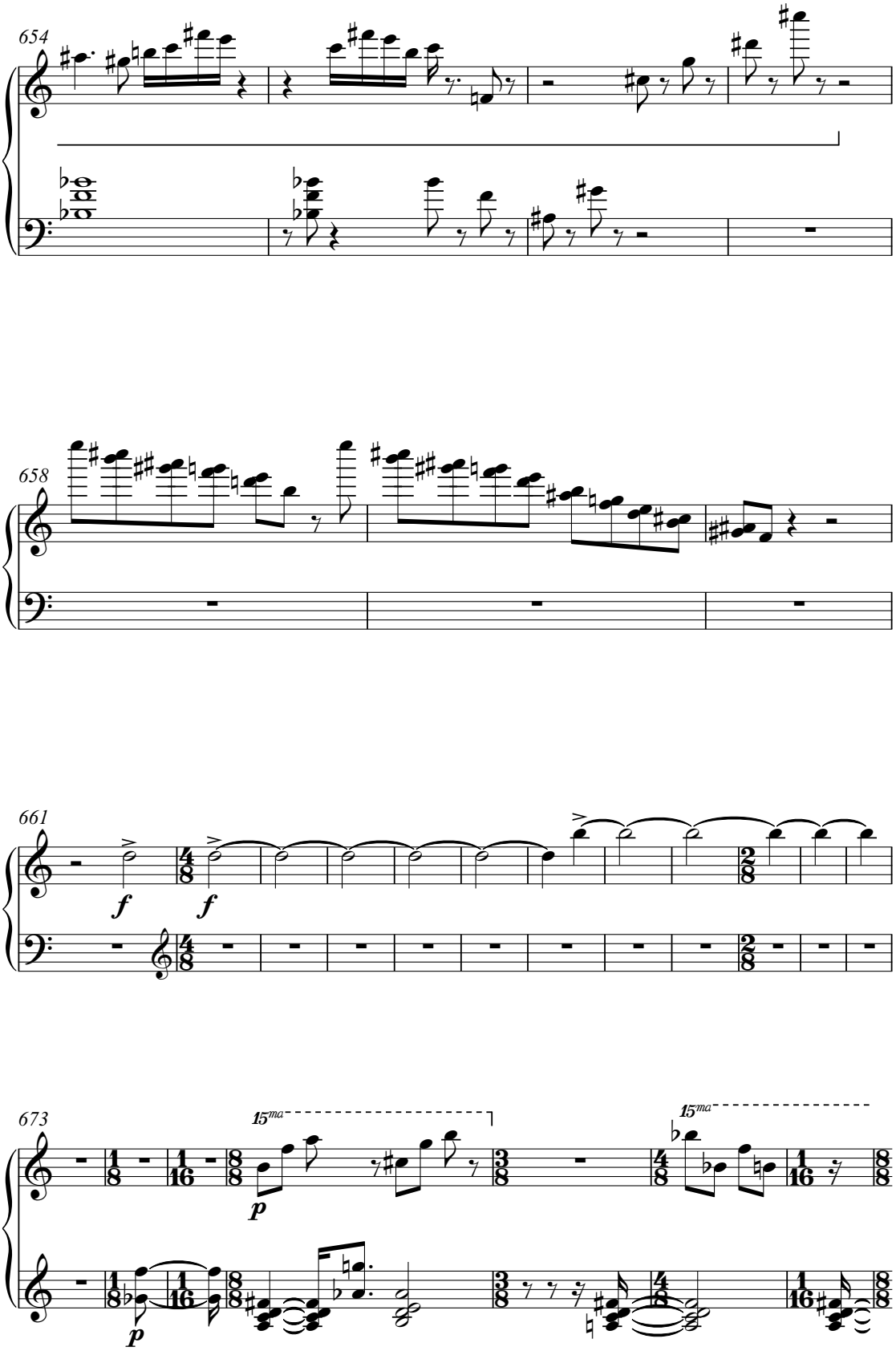

549
27
552
f
f
558
f
p
15ma
569
p

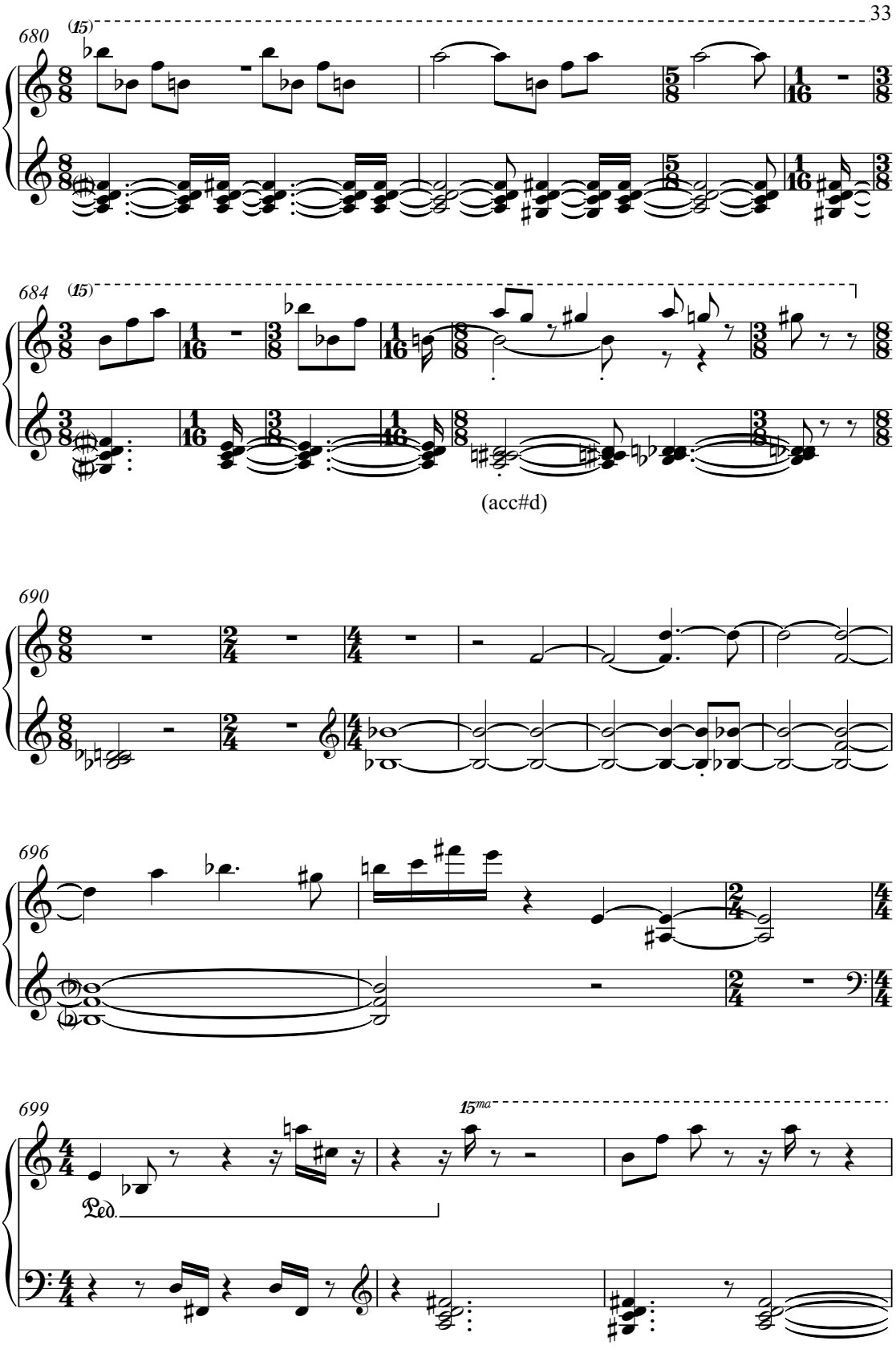

573
(15)
577
(15)
583
588

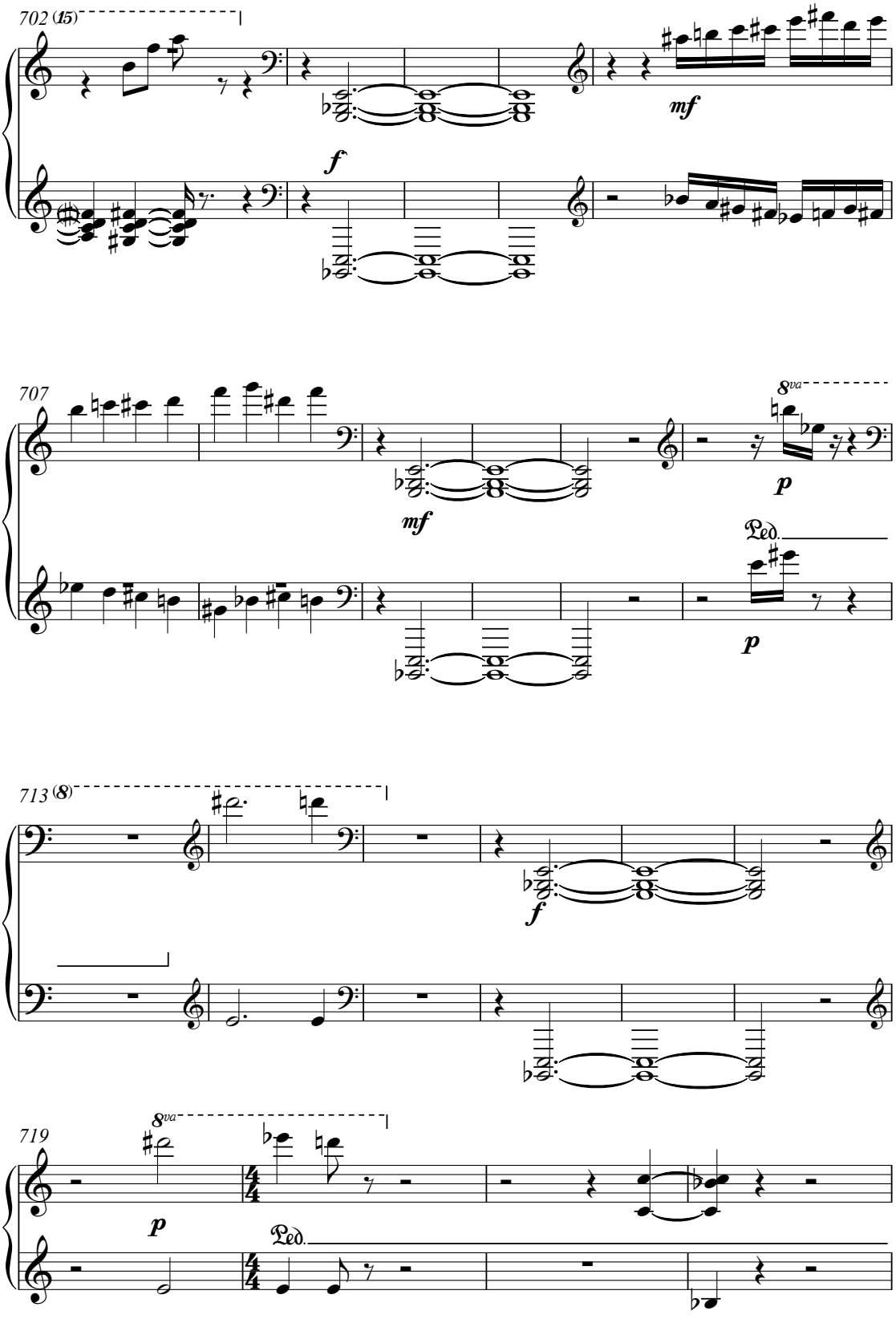

592
15ma
Ped.
596
ff
f
601
fff
605
8va
mf
p
mf
Ped.
mf

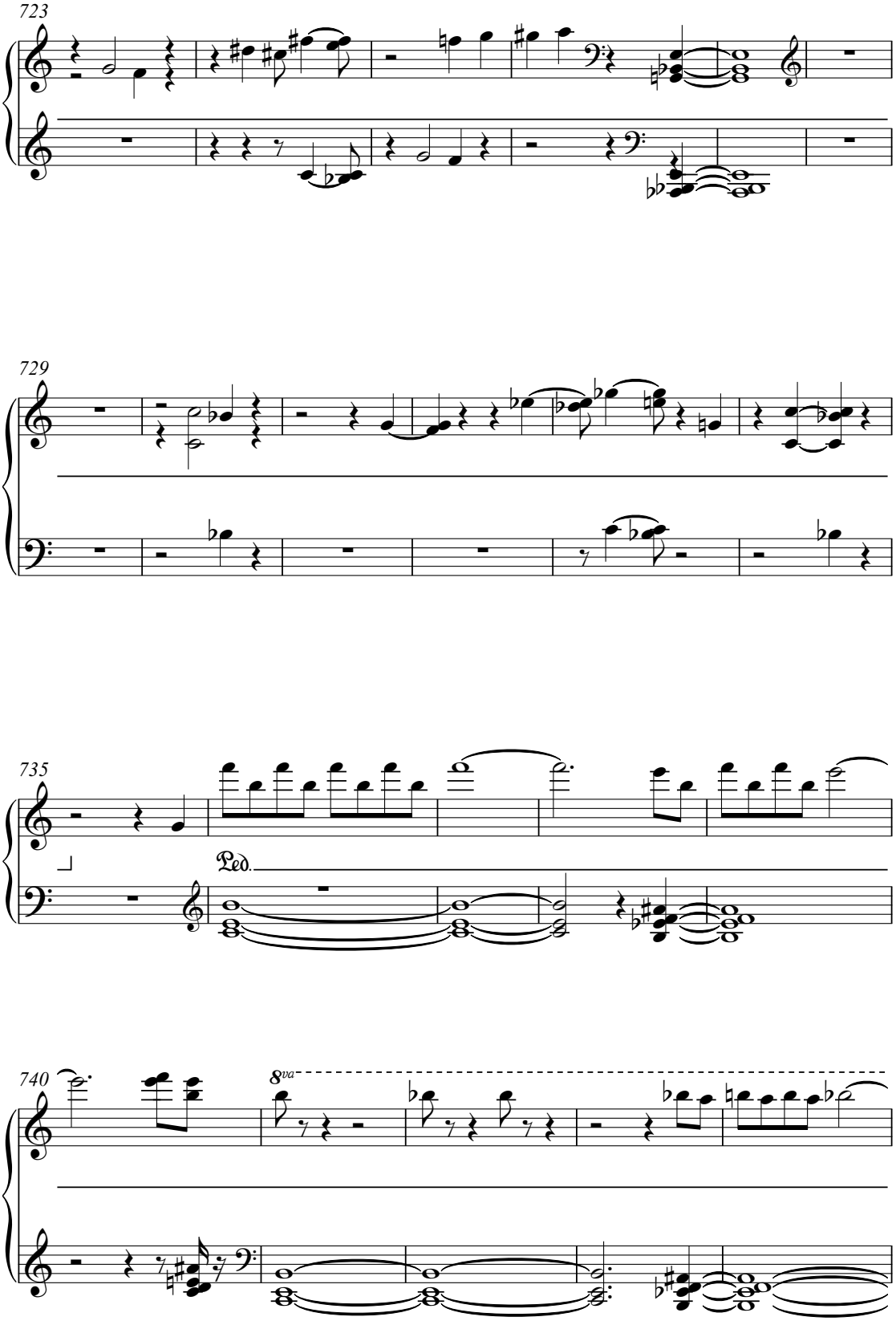

610
8va
p
Ped.
mf
616
p
p
622
mf
628
mf
Ped.

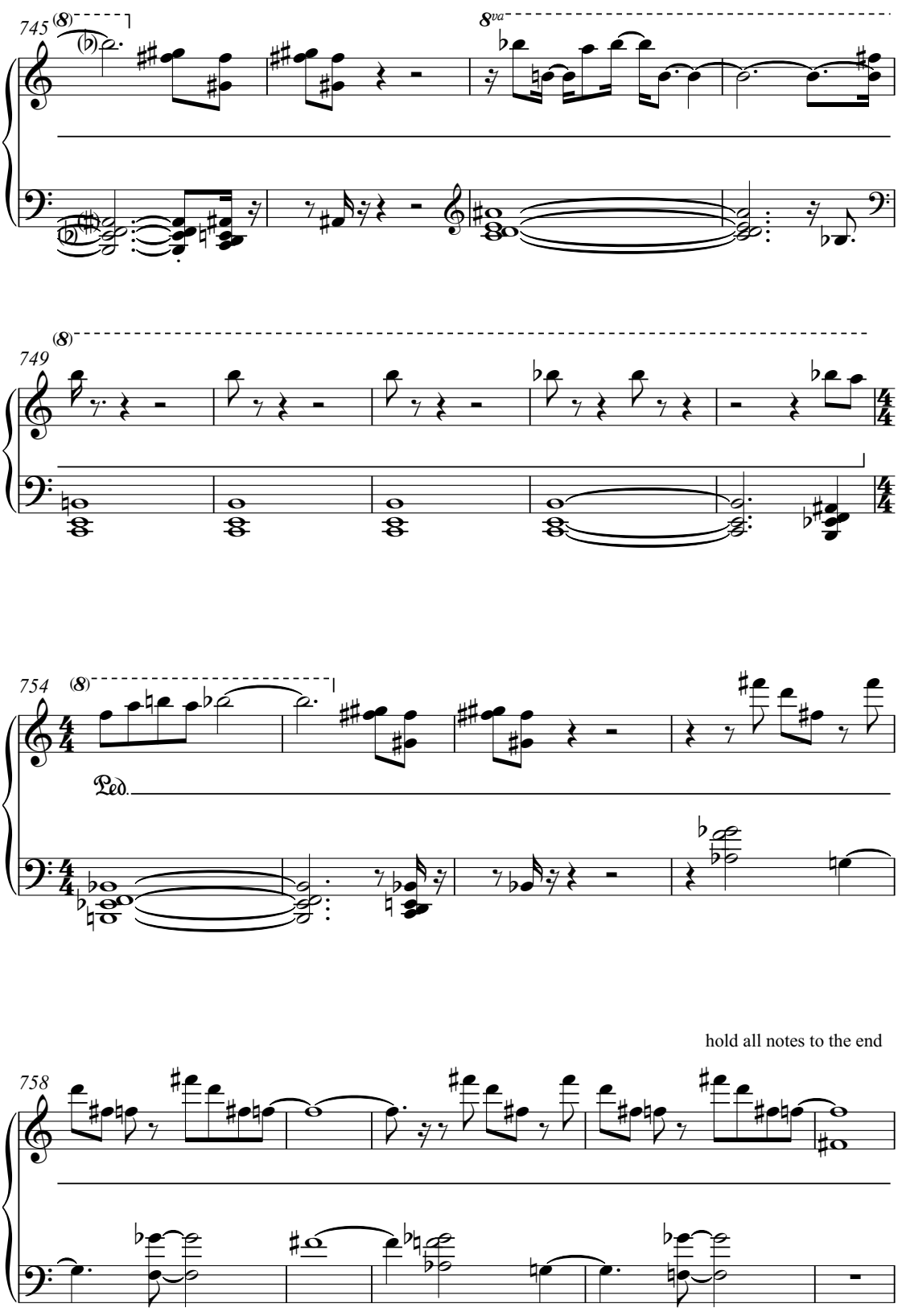

633
f
638
642
647
T
Ped.
p

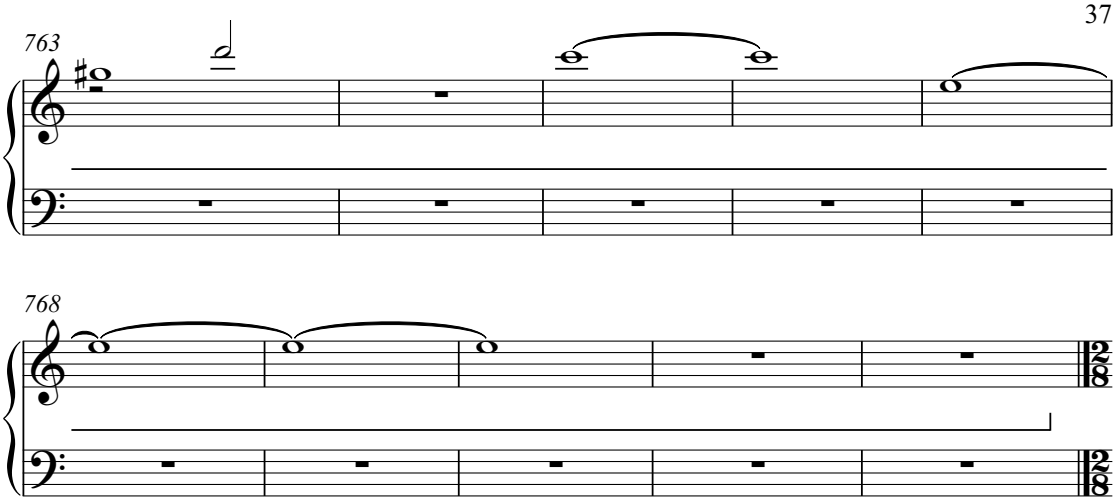

654
658
661
673
15ma
15ma


680
(15)
684
(15)
(acc#d)
690
696
699
15ma
Ped.


702 (15)
f
mf
707
mf
8va
p
Ped.
p
713 (8)
f
719
8va
p
Ped.

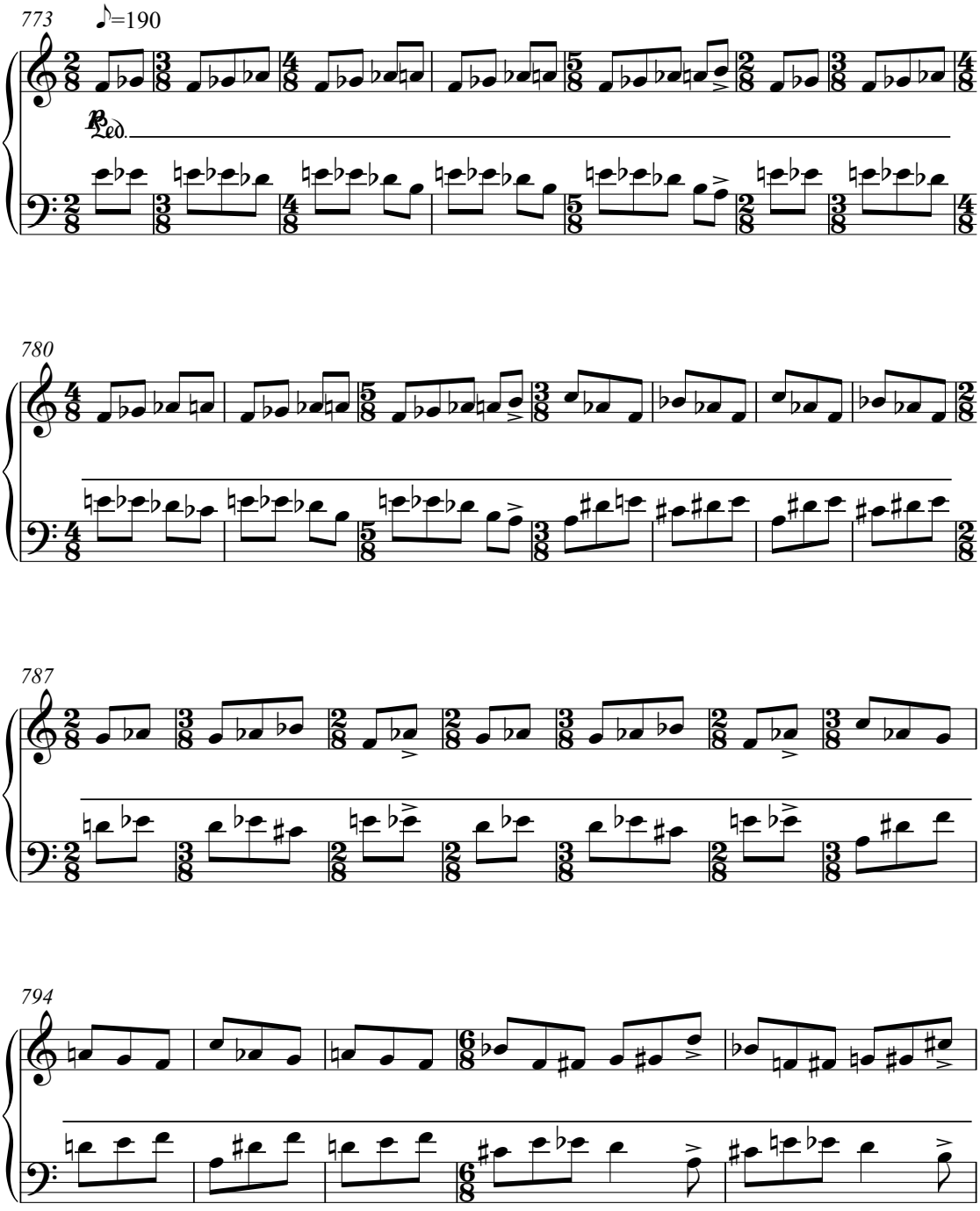

723
729
735
Ped.
740
8va

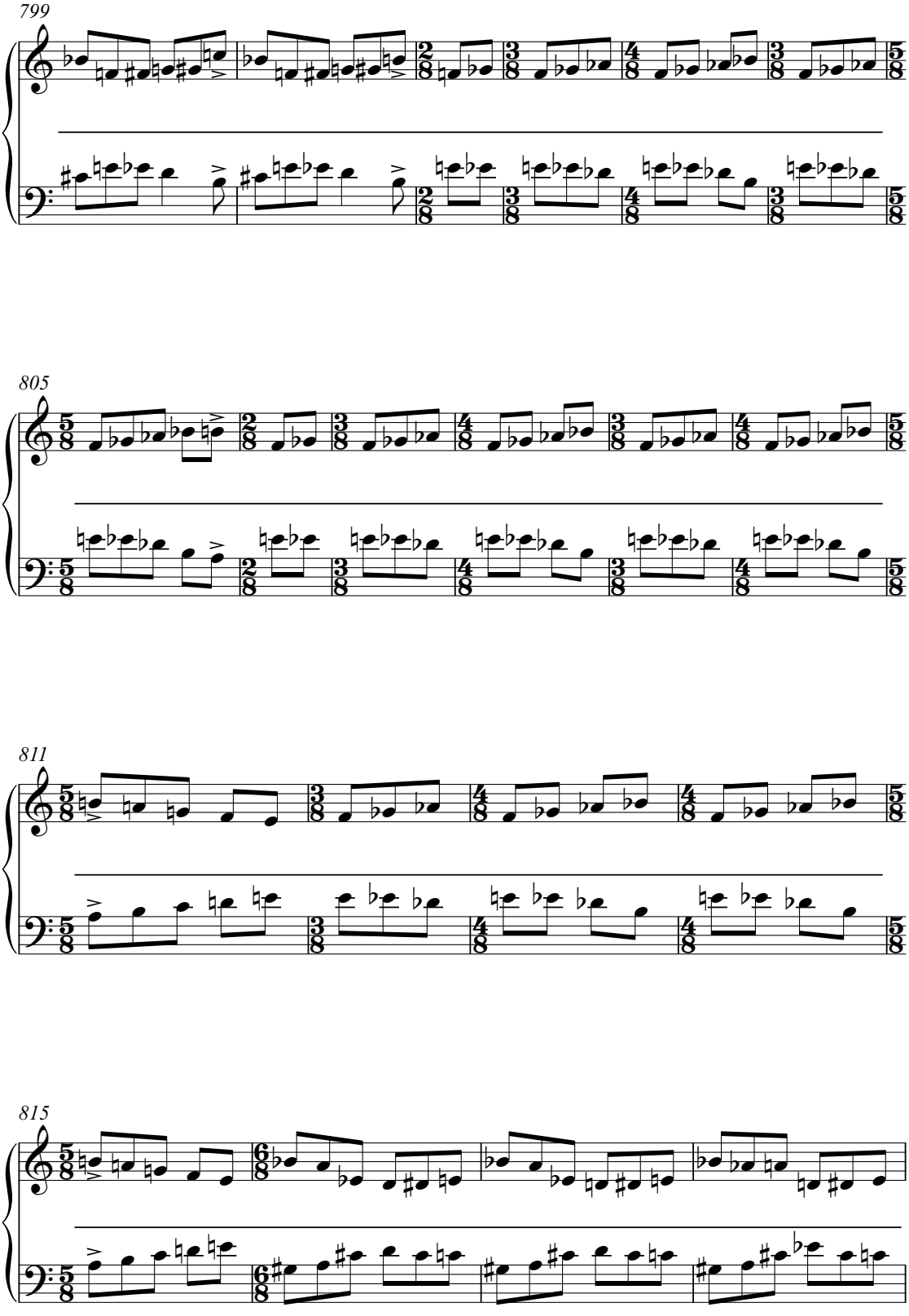

745
8va
749
754
Ped.
hold all notes to the end
758


763
768

IV. Mirror II

Even, Calm, Dreaming, floating, Light, Clouds
Not expressive but not dry either, bordering between melody and harmony
Avoiding definition of form, never dramatic, always listening to timbre

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811
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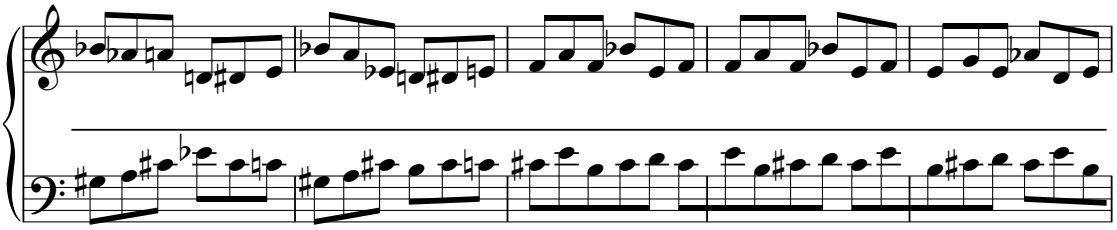

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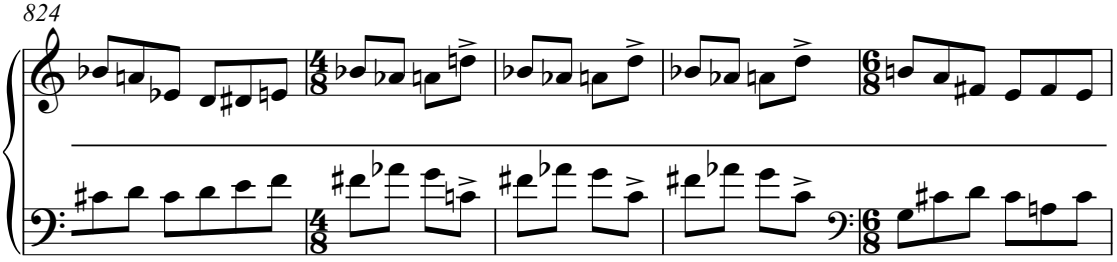

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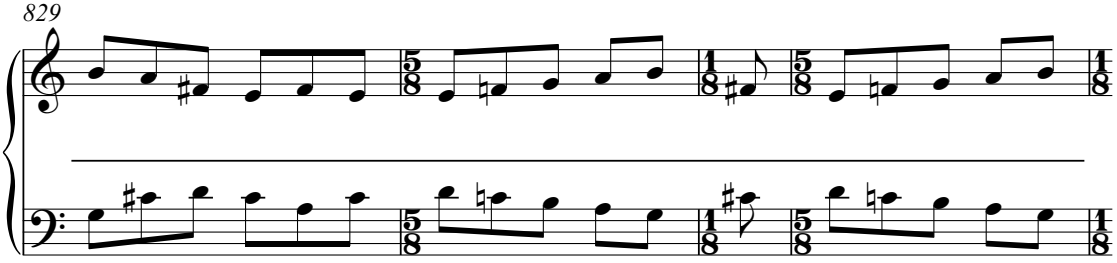

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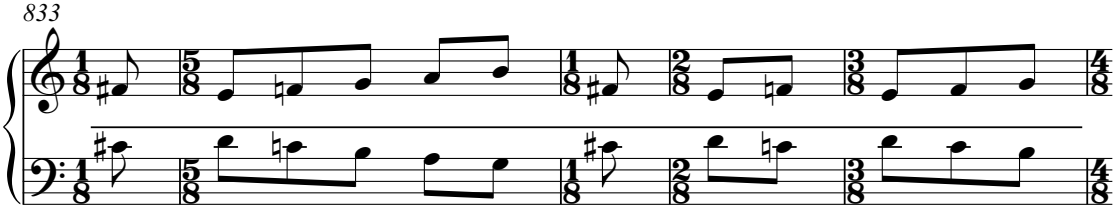

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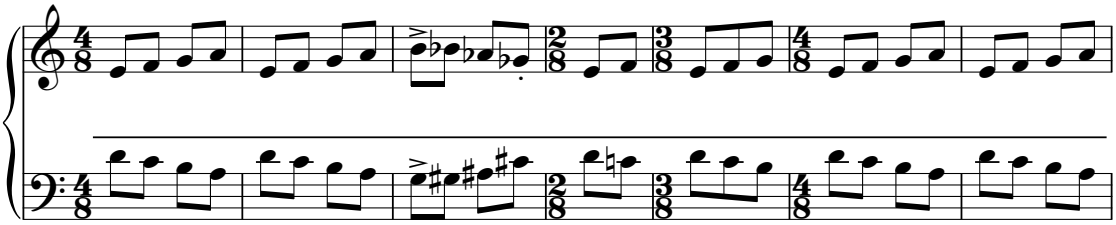

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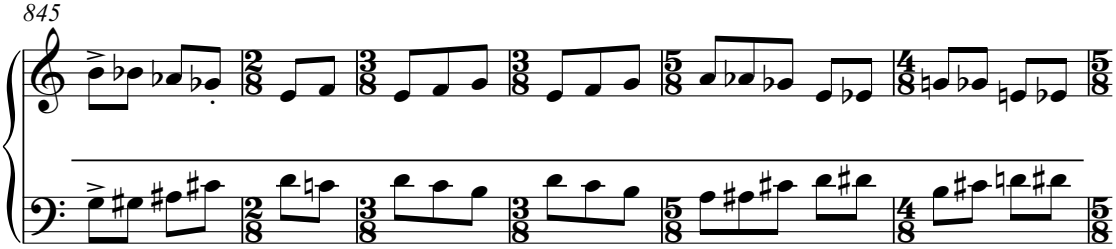

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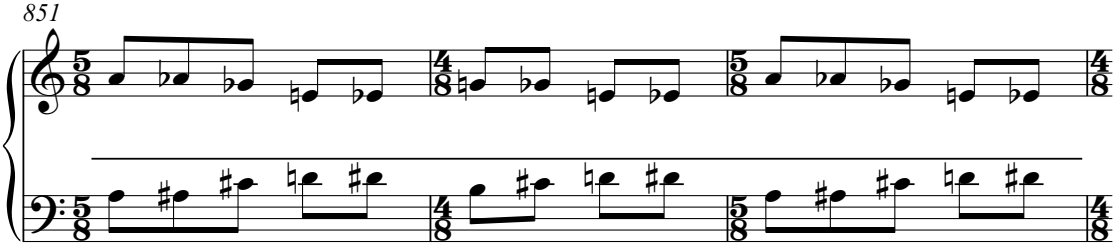

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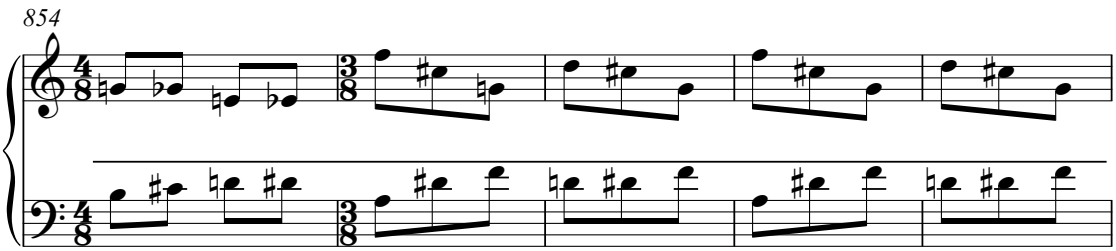

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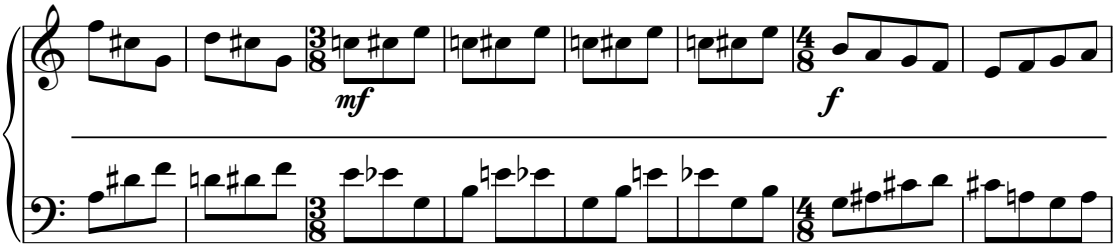

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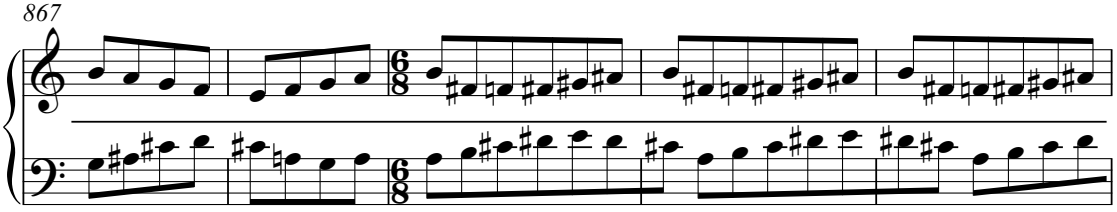

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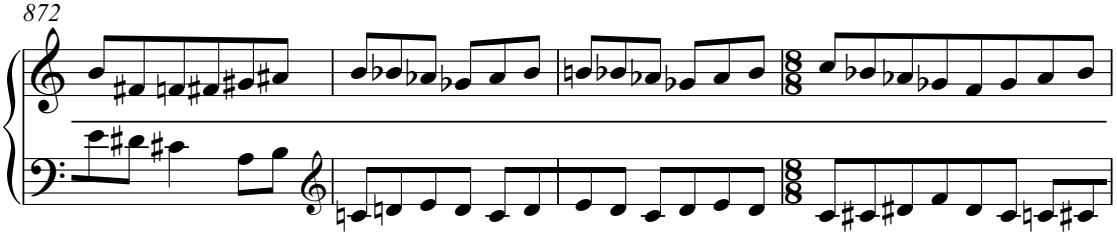

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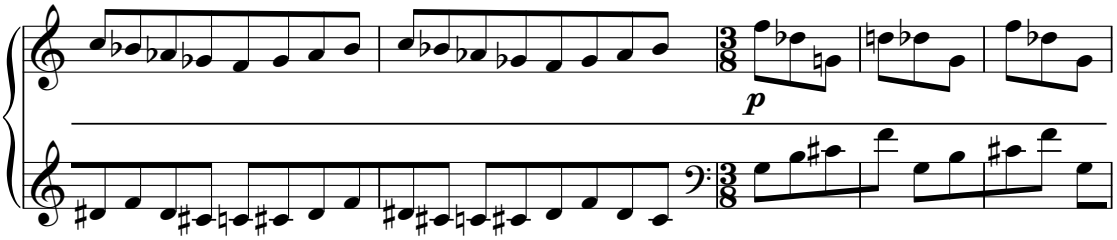

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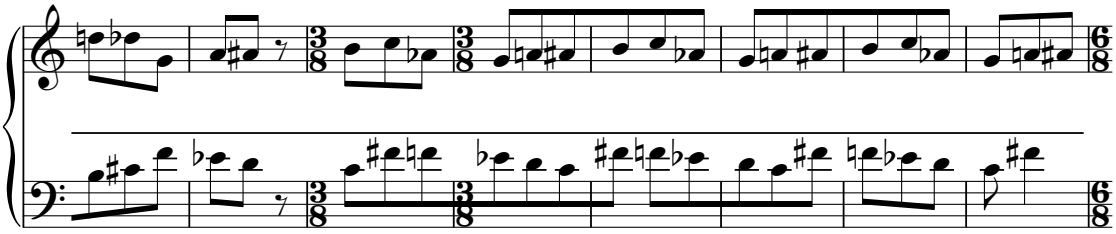

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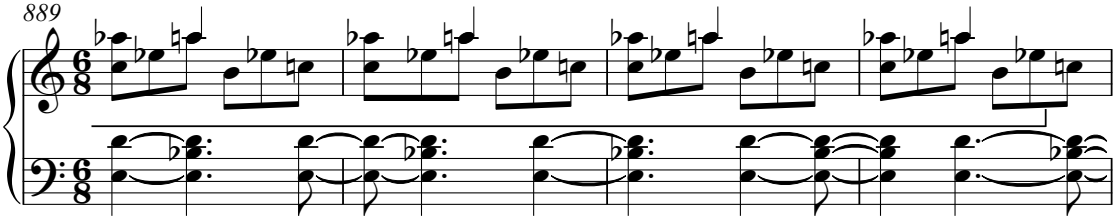

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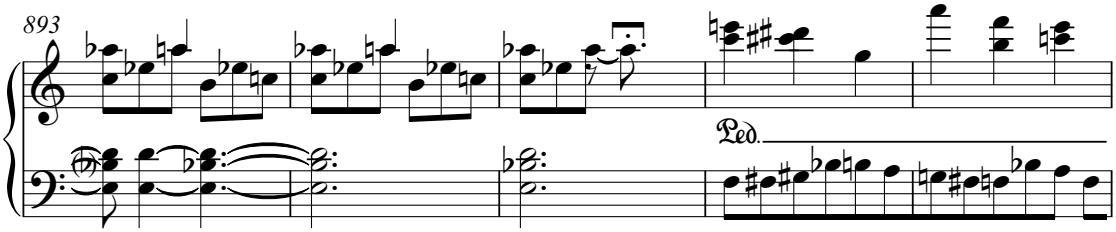

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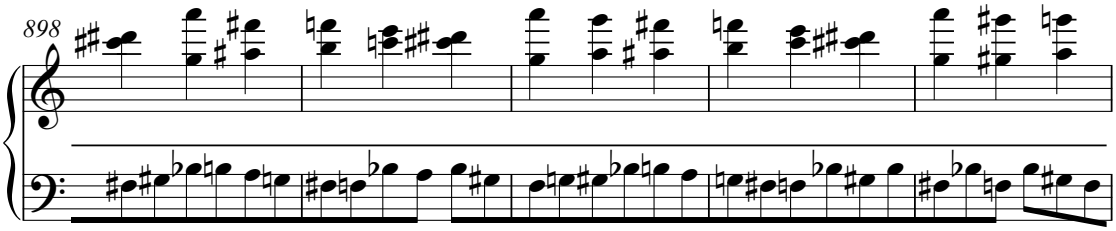
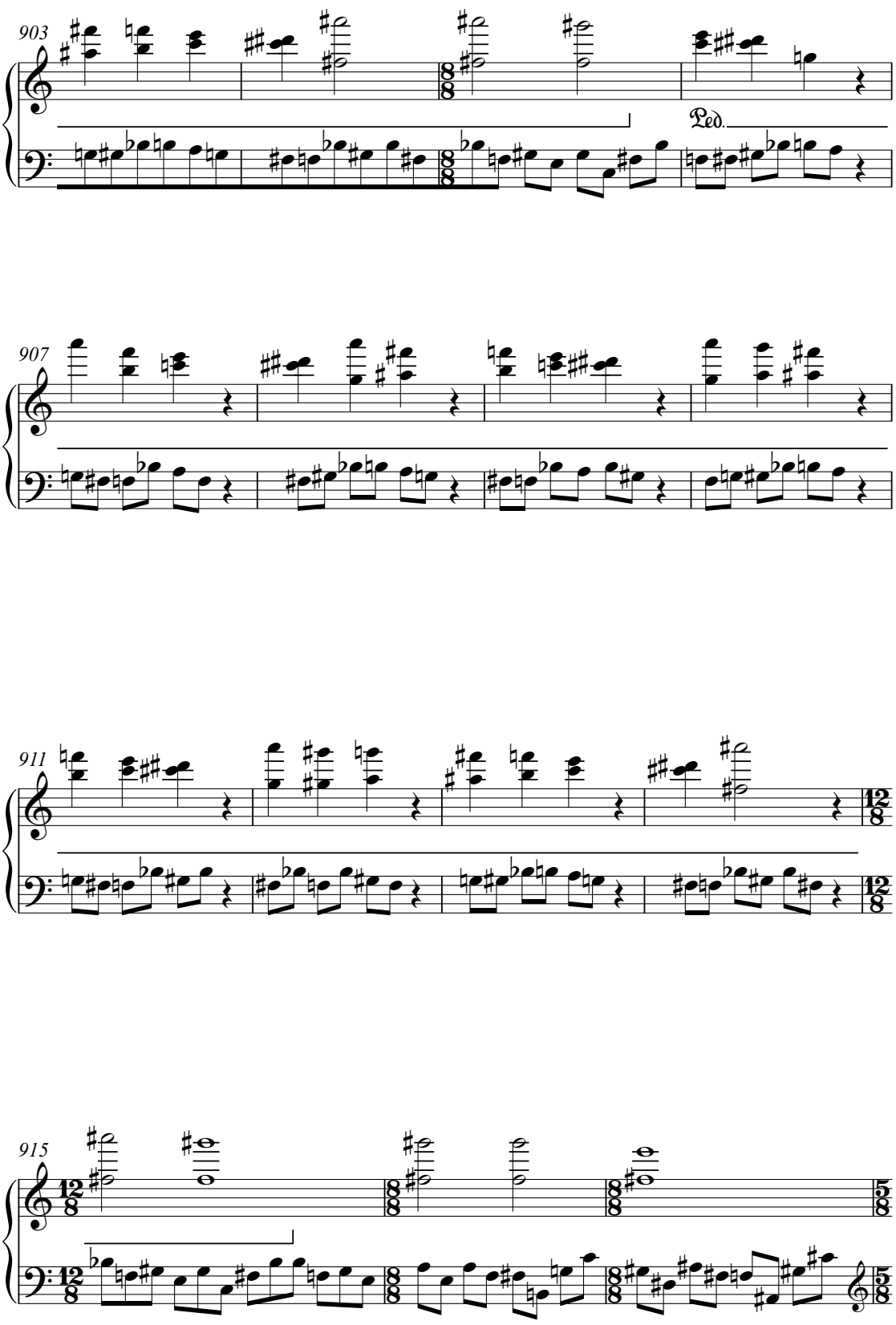
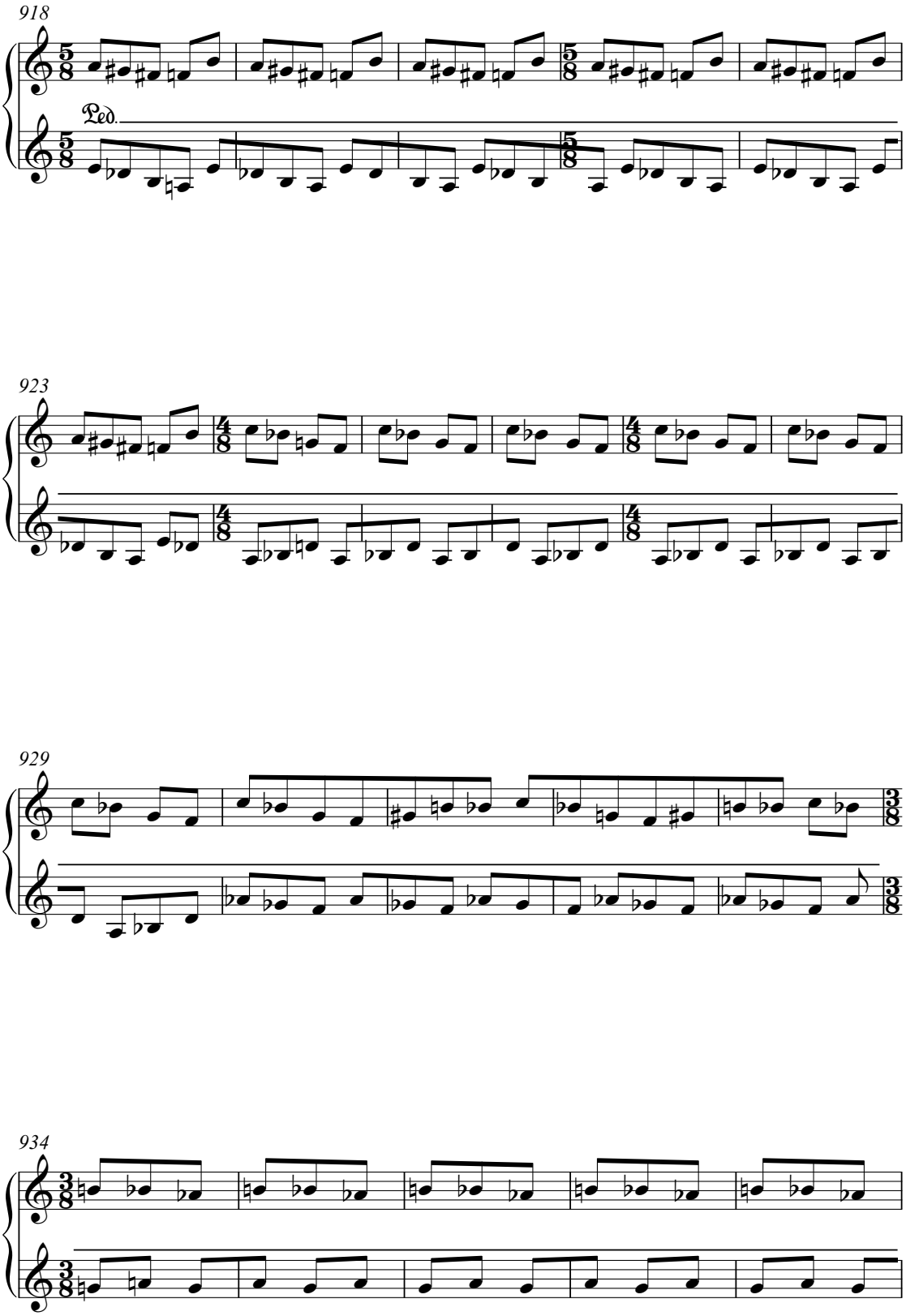
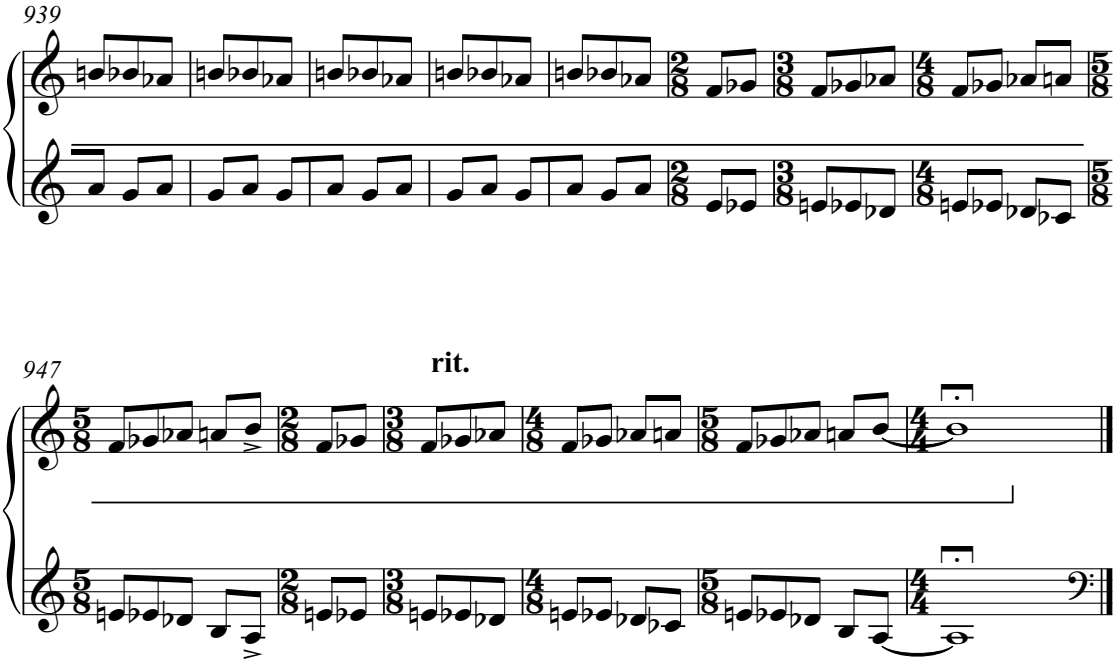


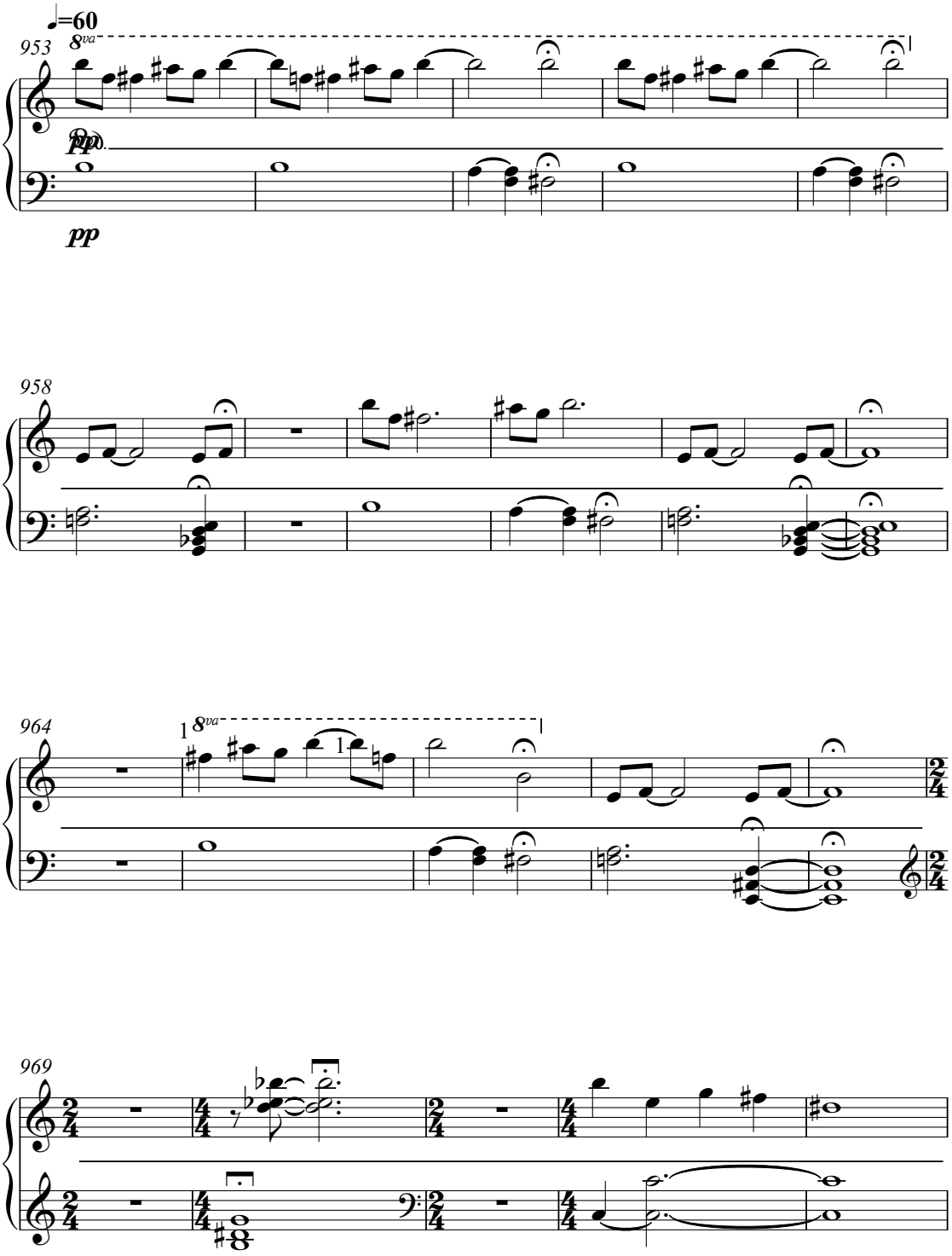

903
Ped.
907
911
915

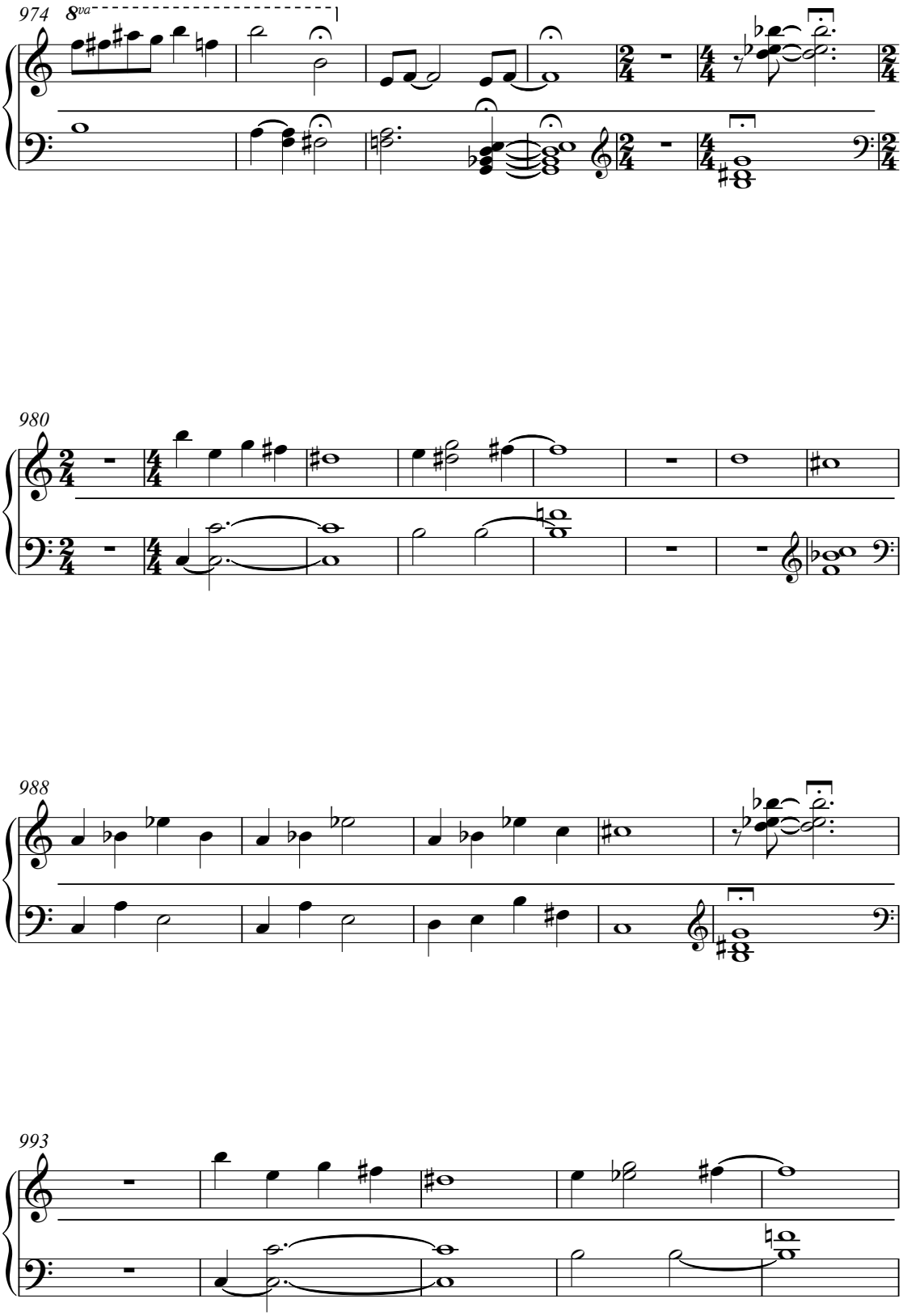

918
Ped.
923
929
934

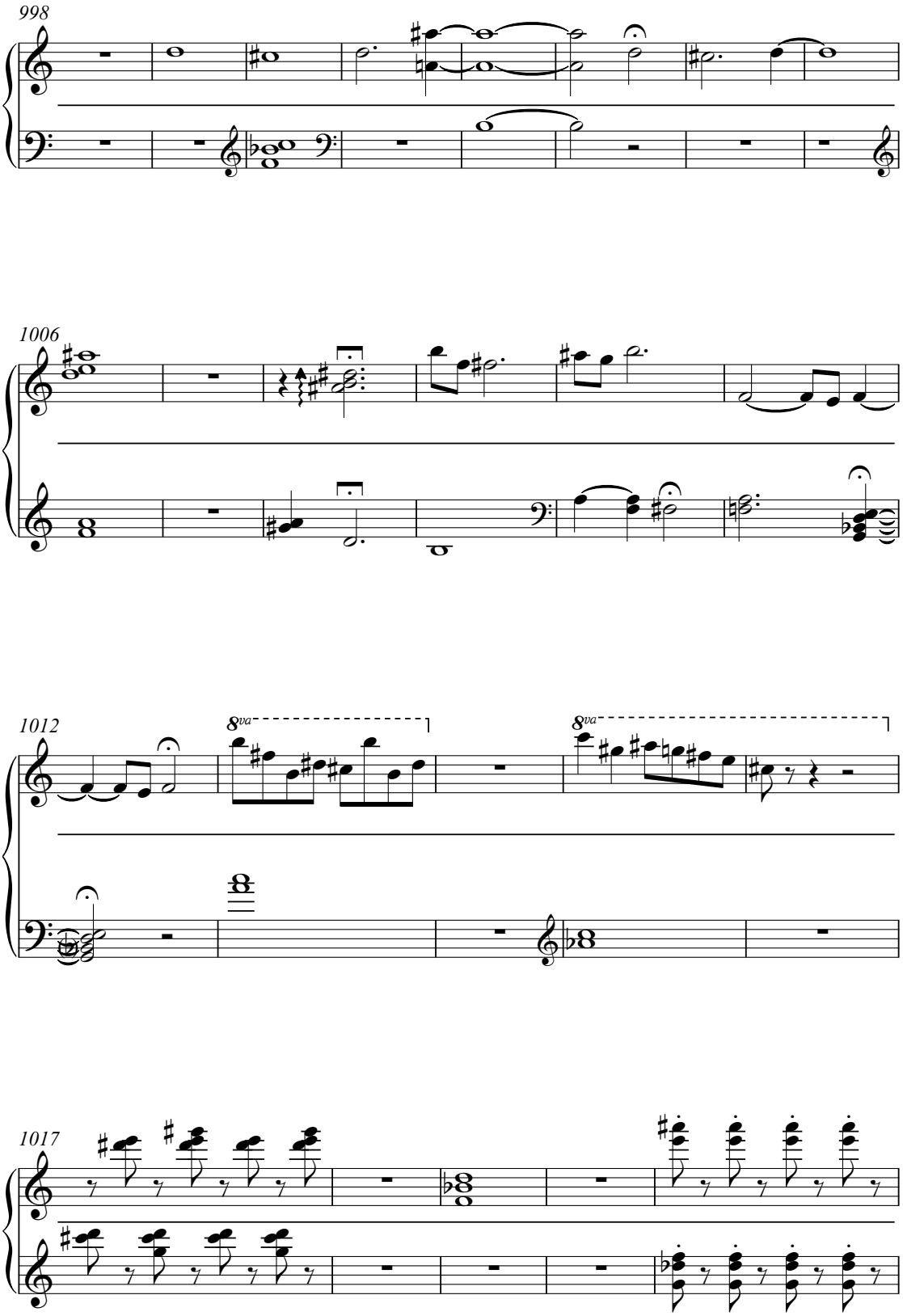

939
947
rit.

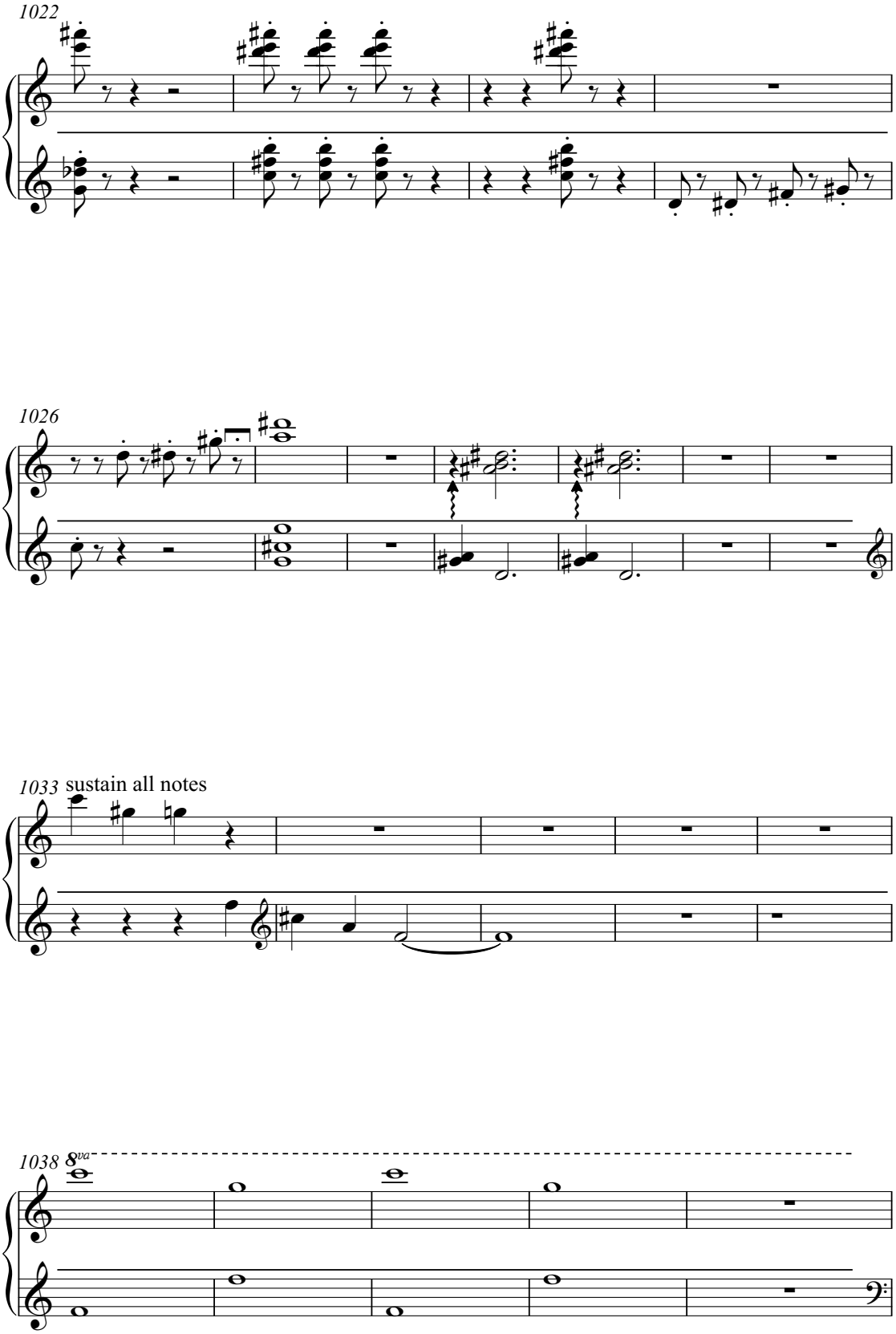
V. Fibonacci Memory II

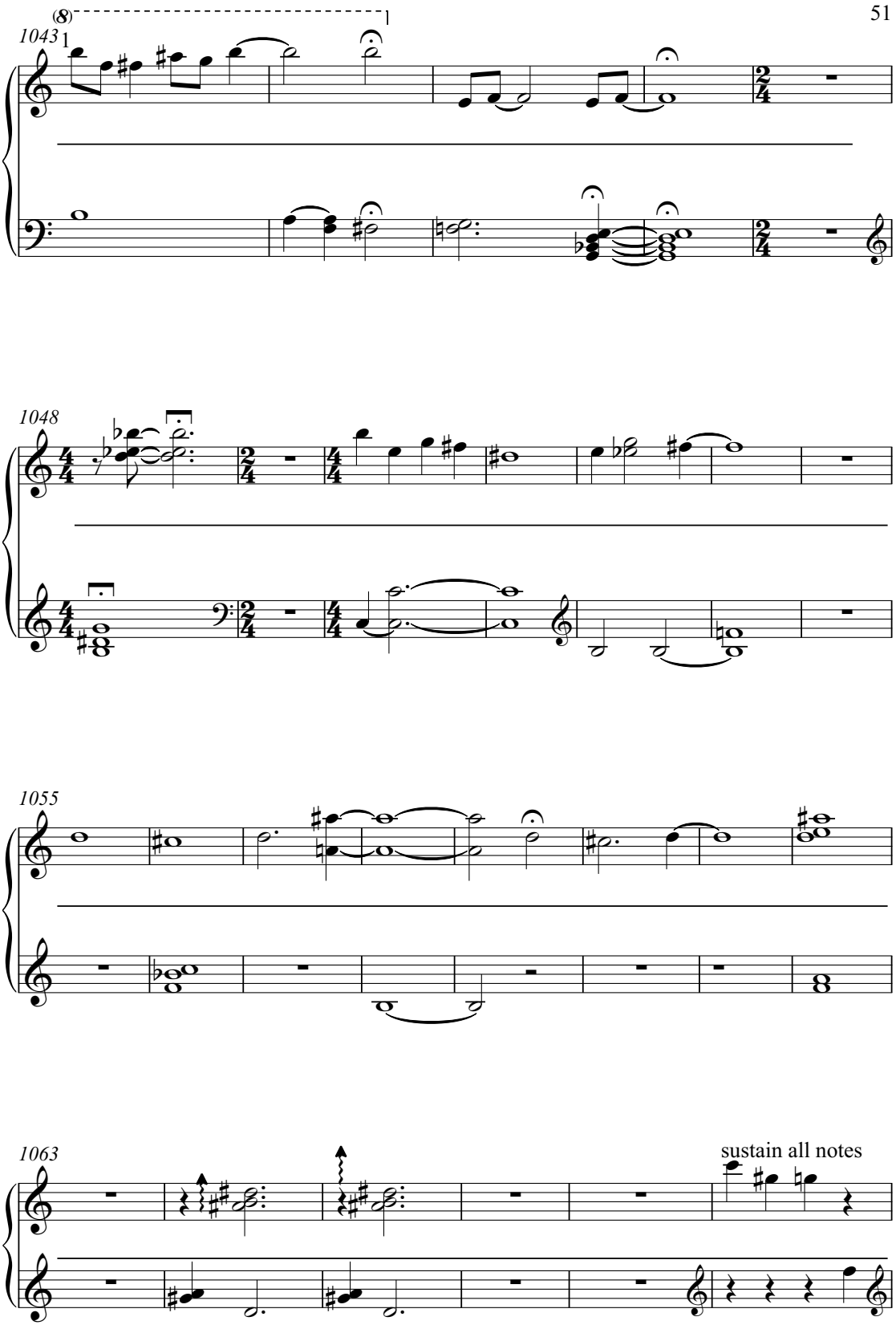
Deeply melancholic, Evoking Nostalgia, Anti-dramatic, melodic, like a song, visual, synesthetic
every note is deeply meaningful, paying attention to the slightiest change in timbre, always listening, every note is an entity, mediatative, with a sense of space, deceivingly static, always moving, day dreaming...




974
8va
980
988
993


998
1006
1012
8va
8va
1017


50
1022
1026
1033
sustain all notes
1038
8va


(8)
1043
1048
1055
1063
sustain all notes

4

1069

8va

(8)

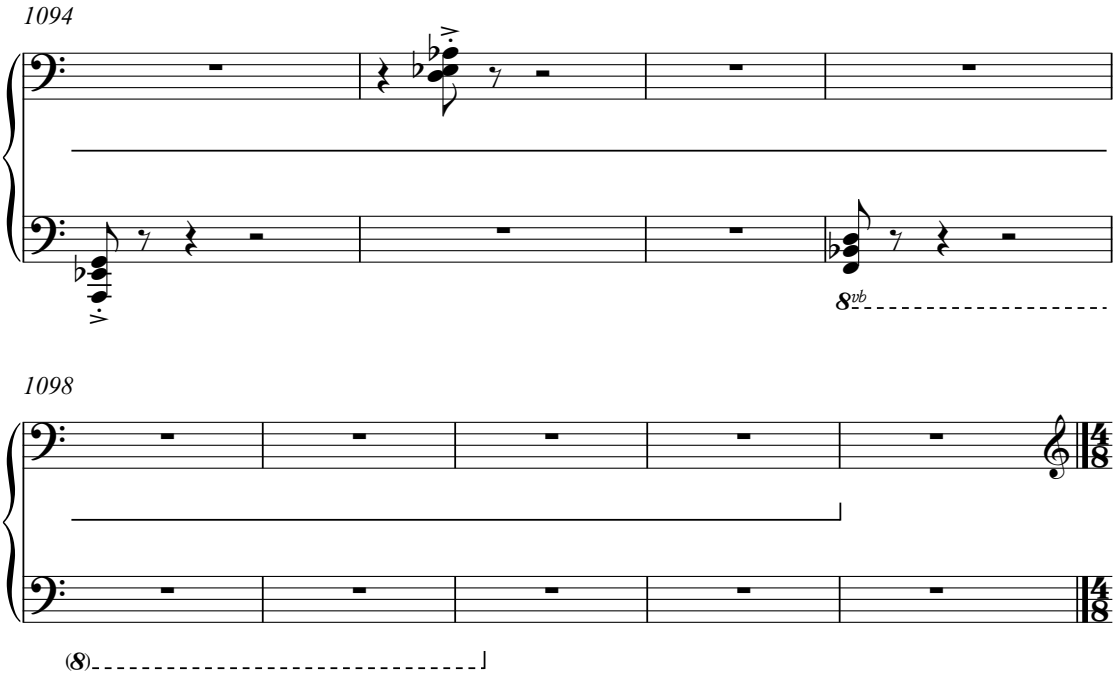
1078

8va

8va

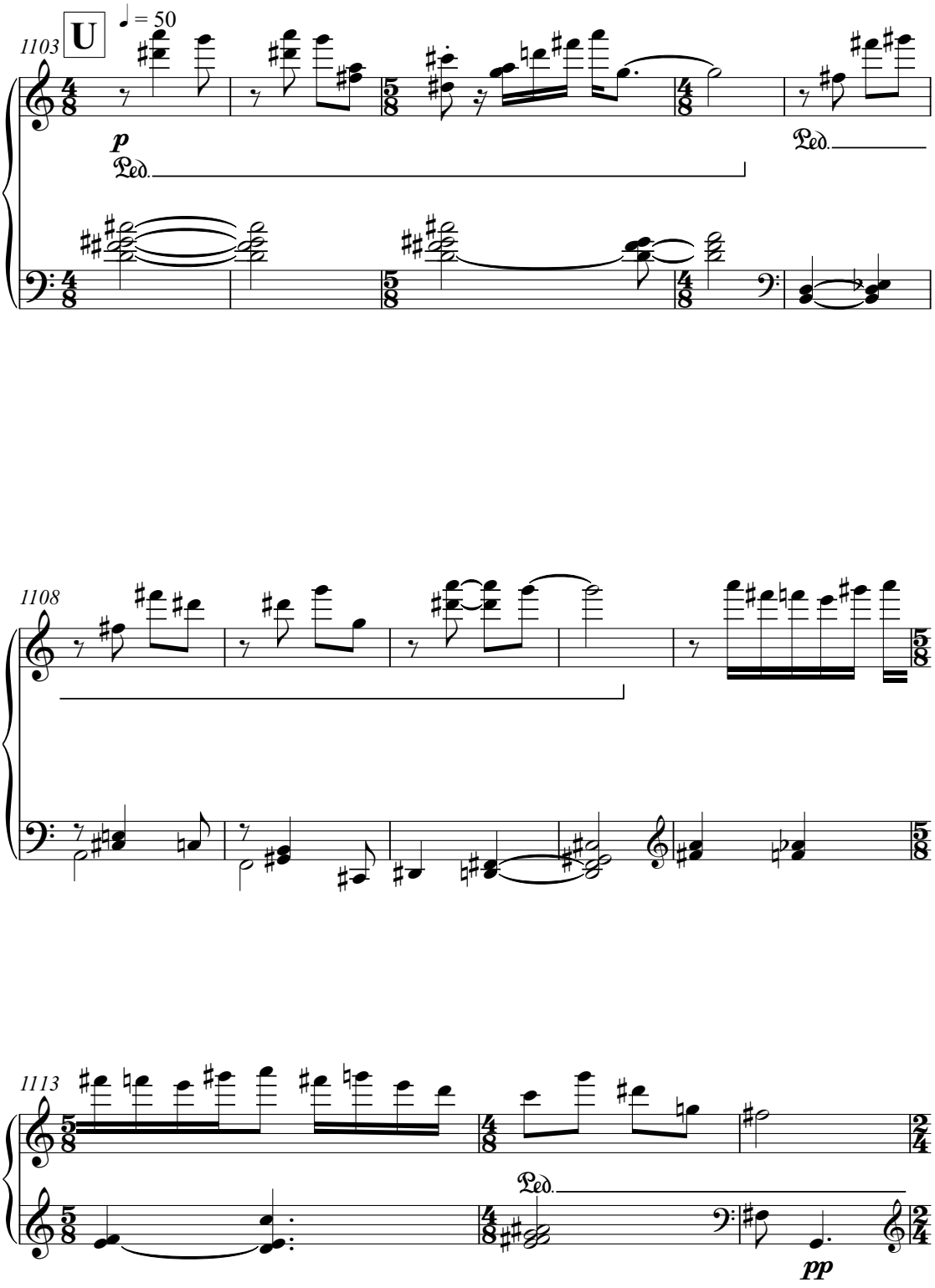
1085

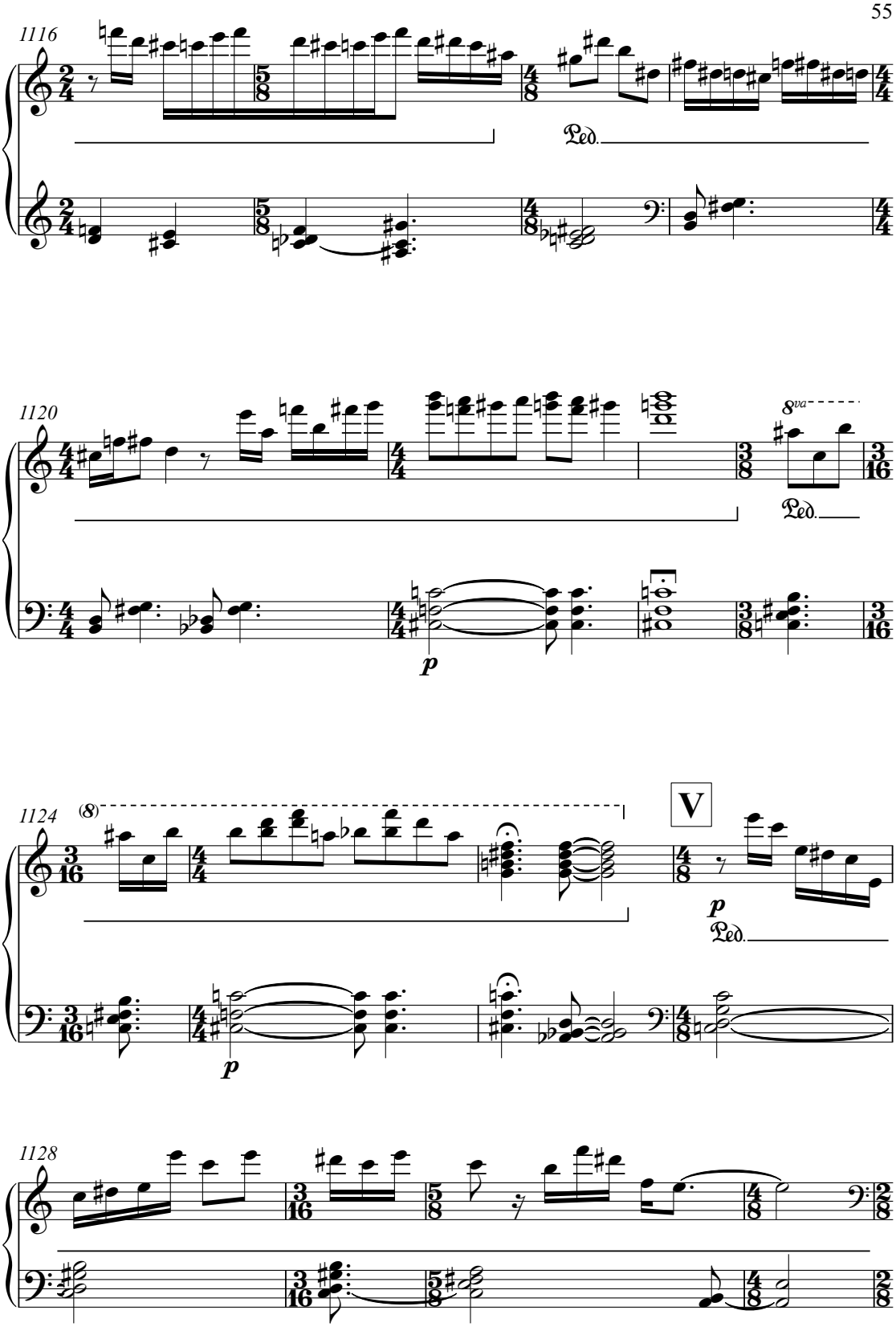
1090


1094
8vb
1098
(8)

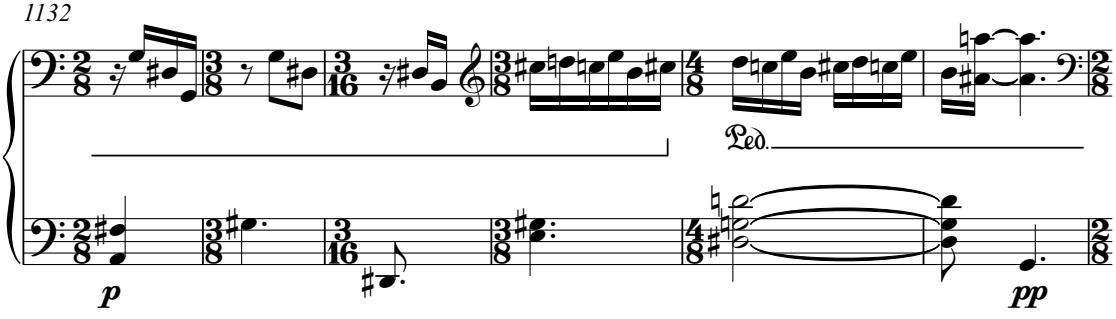
VI. Felipe and the Cat

Anecdotal, a childrens' story from the past




1116
Ped.
1120
8va
Ped.
p
1124
(8)
V
p
Ped.
p
1128

1132



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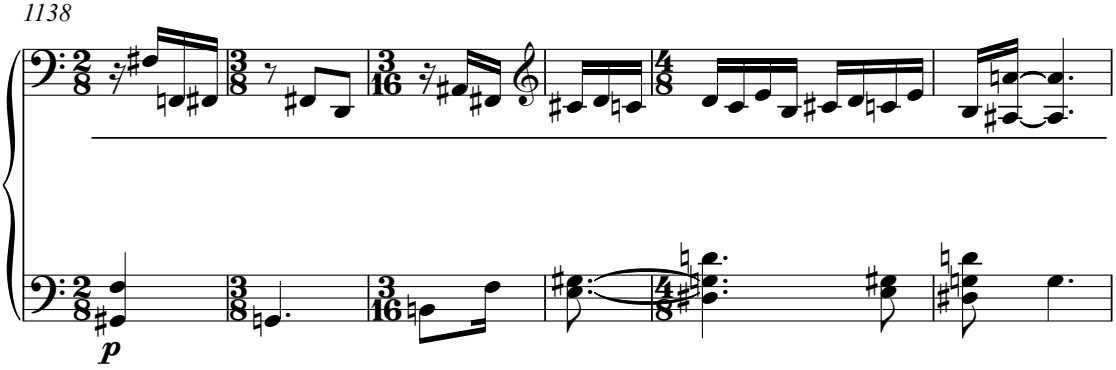

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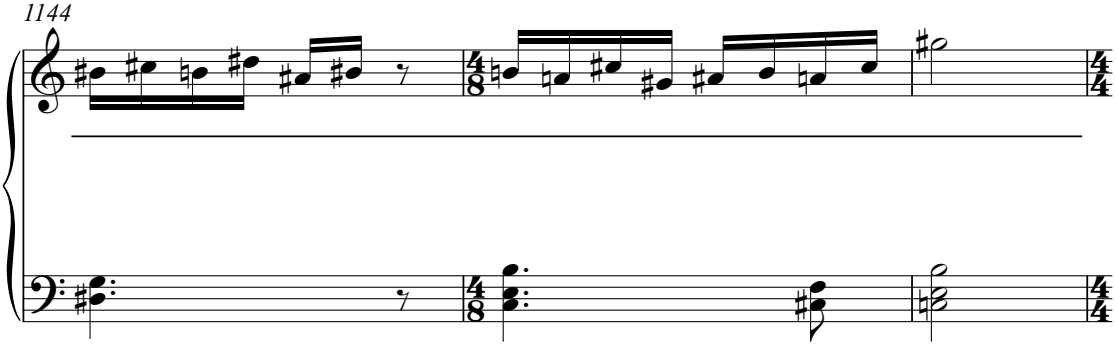

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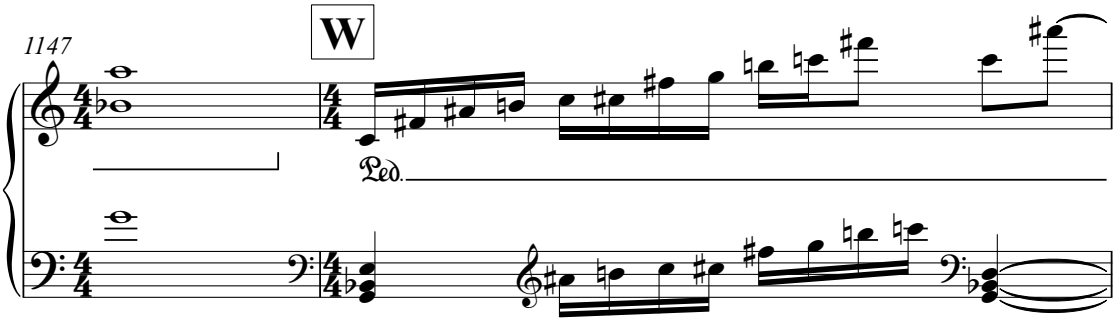

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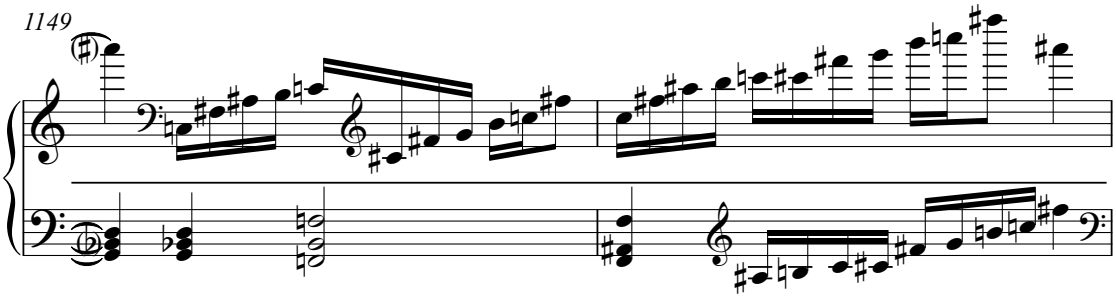

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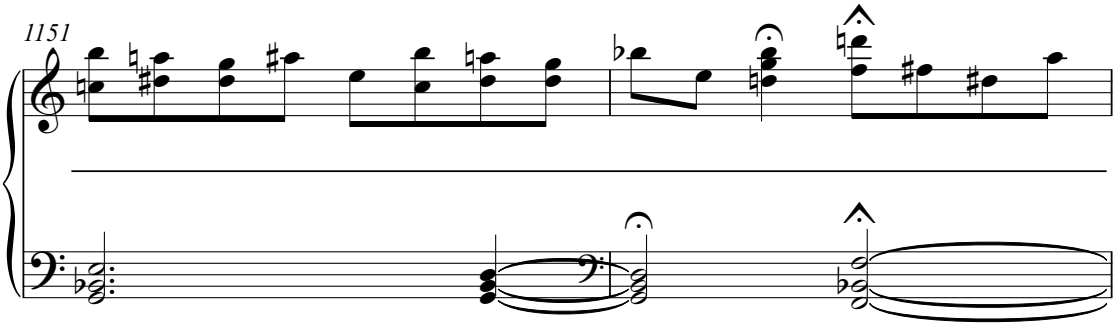

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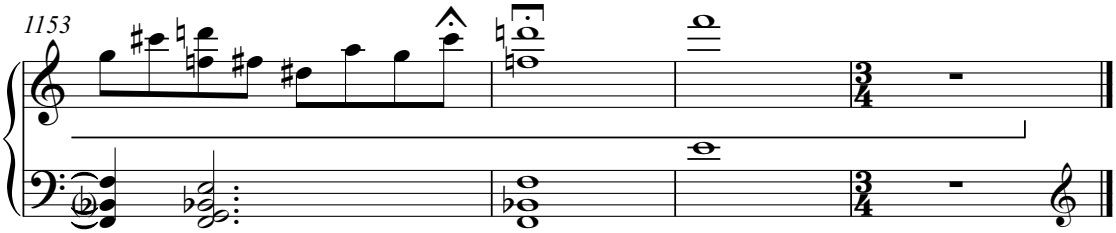


C.4

Death of a Moon (2016)

For 7 Contrabasses

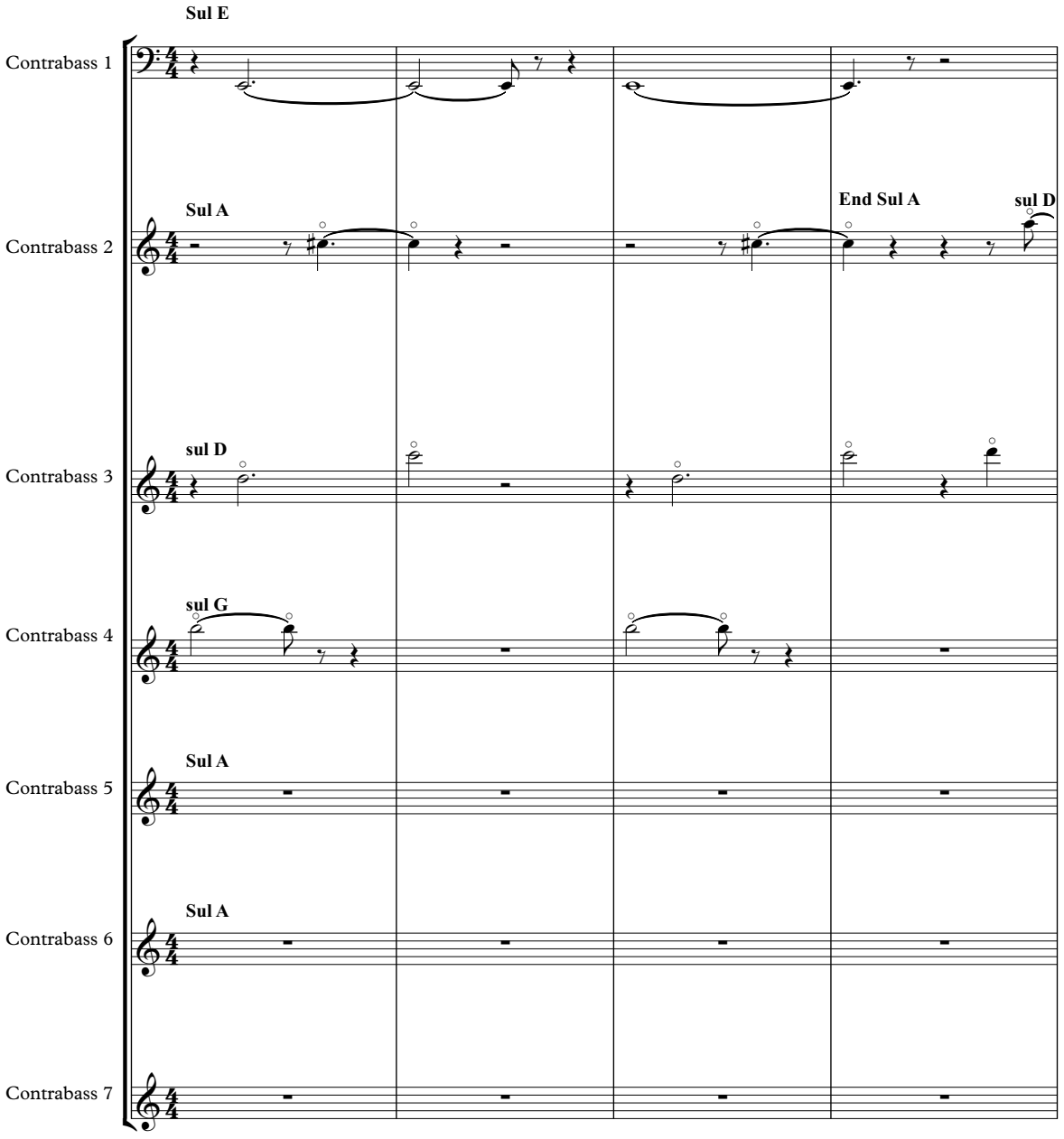
Ori Barel

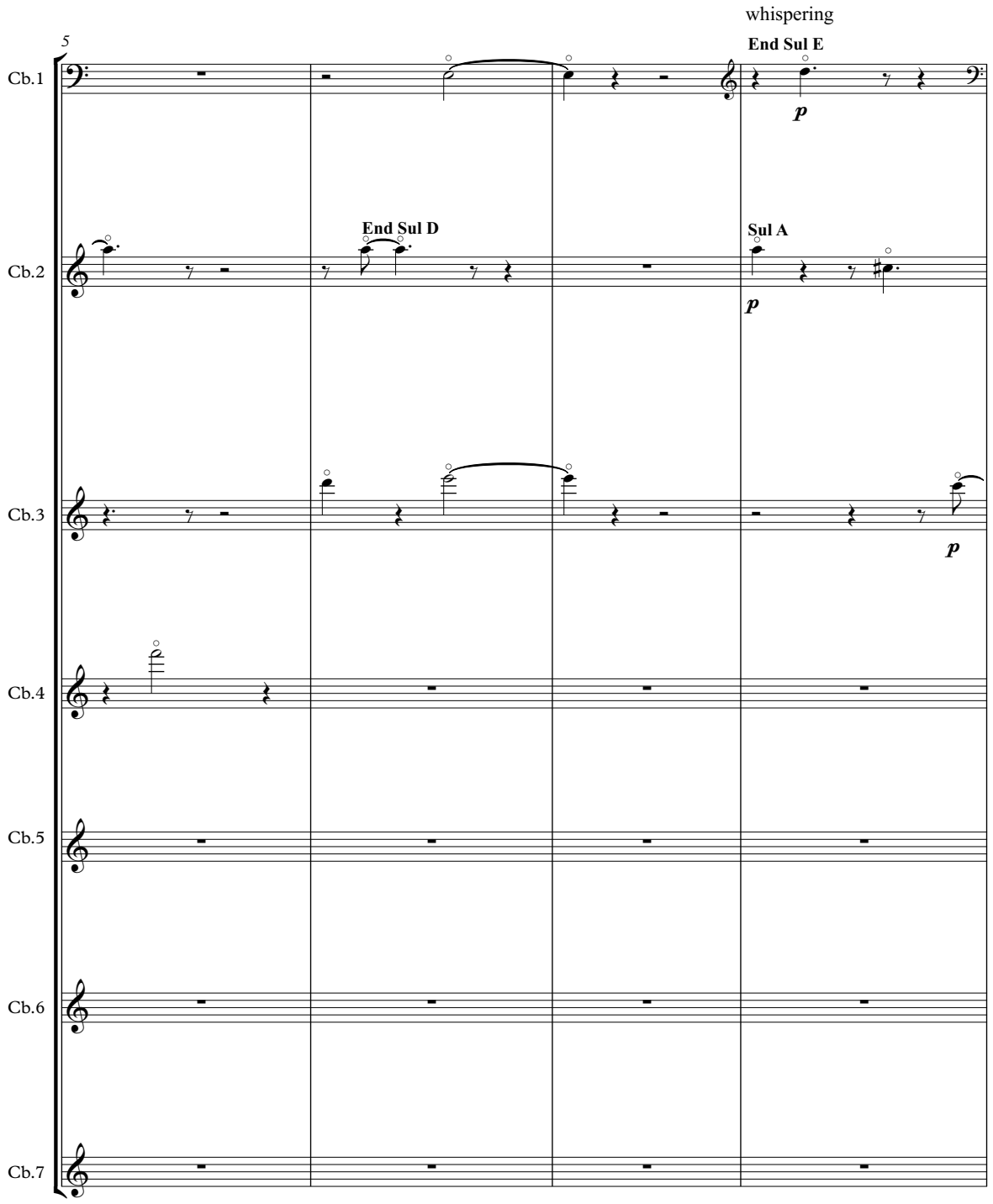
Death of a Moon- For 7 Contrabasses

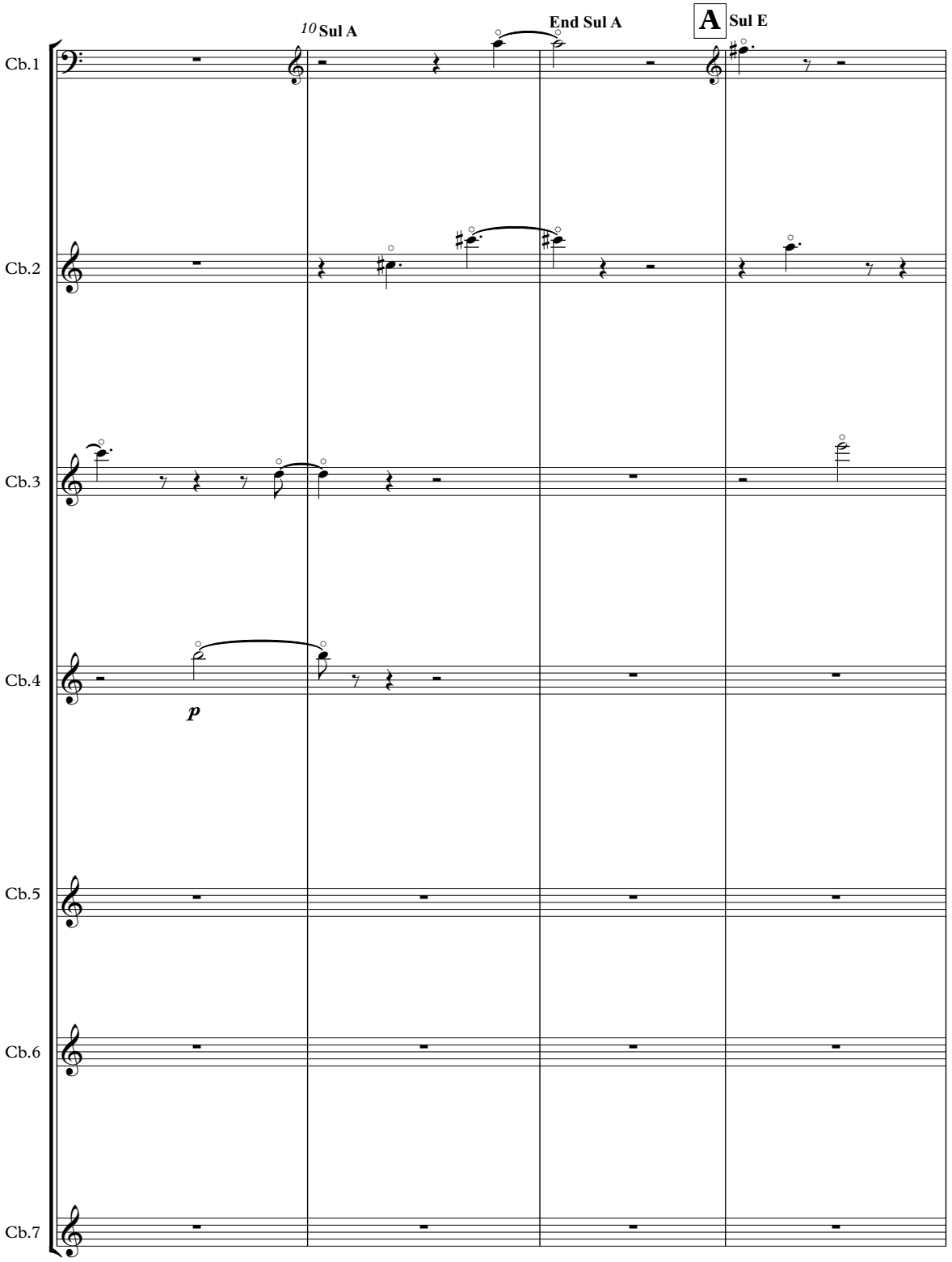
Death of a Moon- For 7 Contrabasses

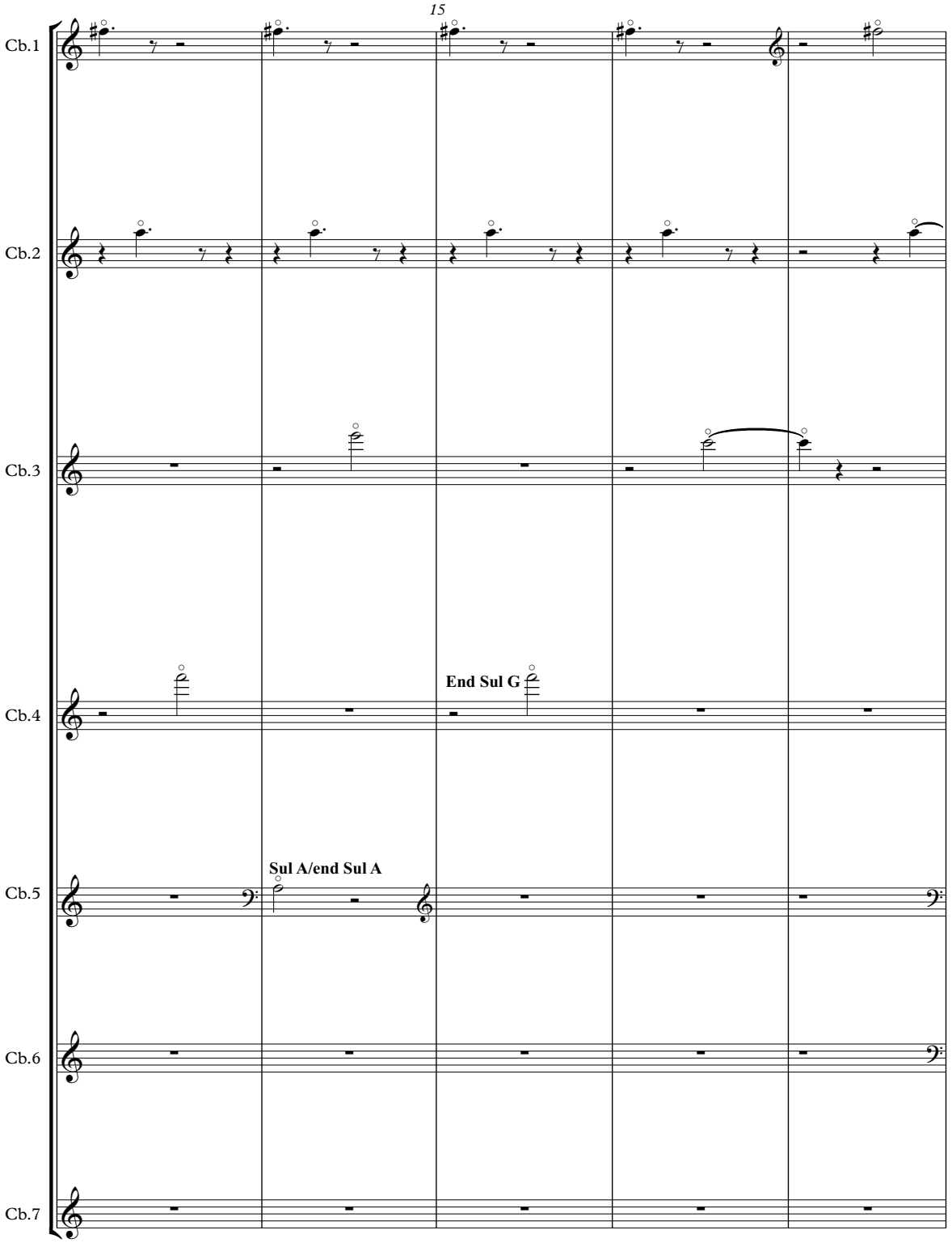
with some vibrato (but not exaggerated or dry)
always thinking about melody
notes are separated but they generally belong to melodic contours
emotional, yet serious and contained

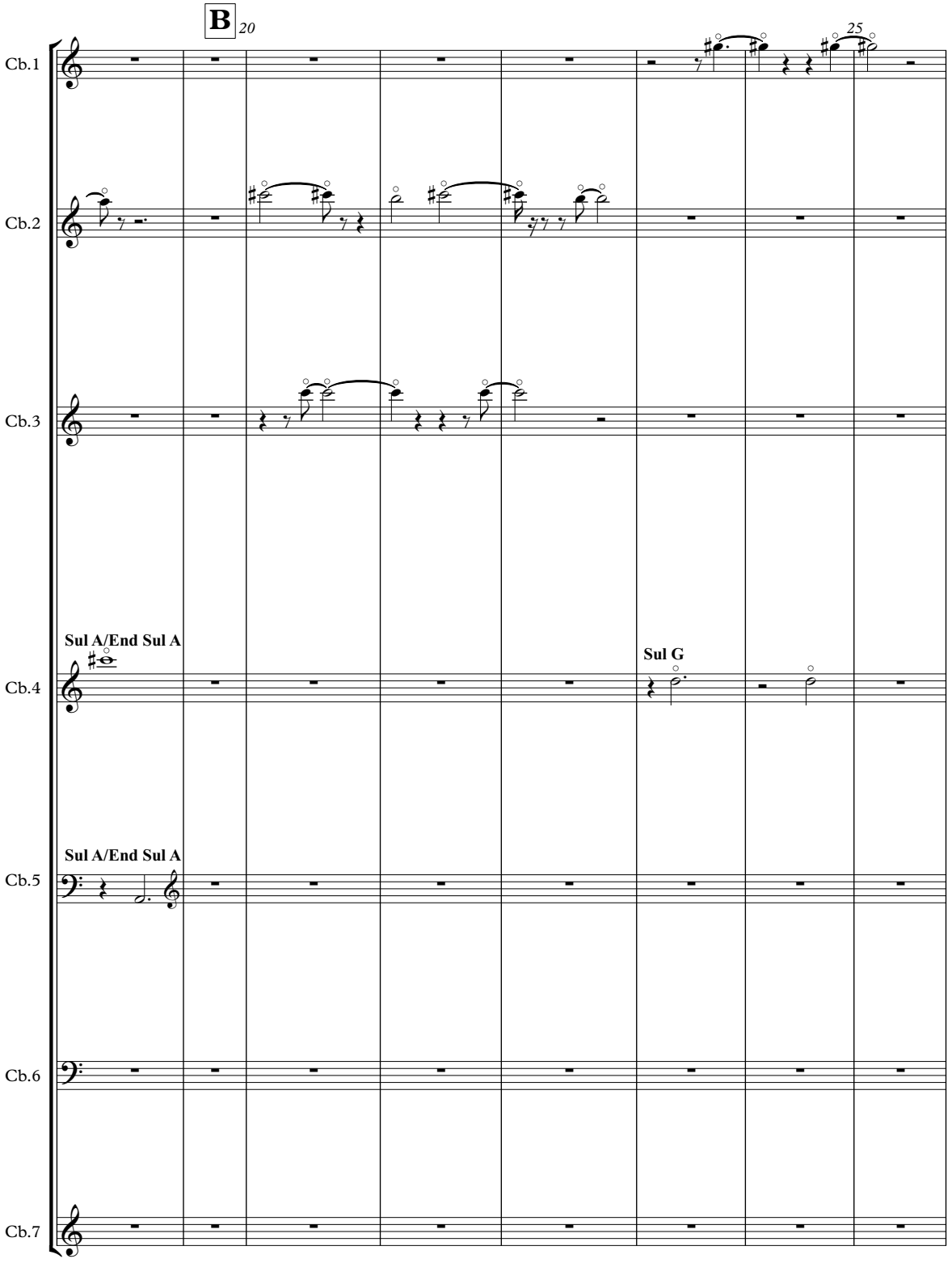
Ori Barel

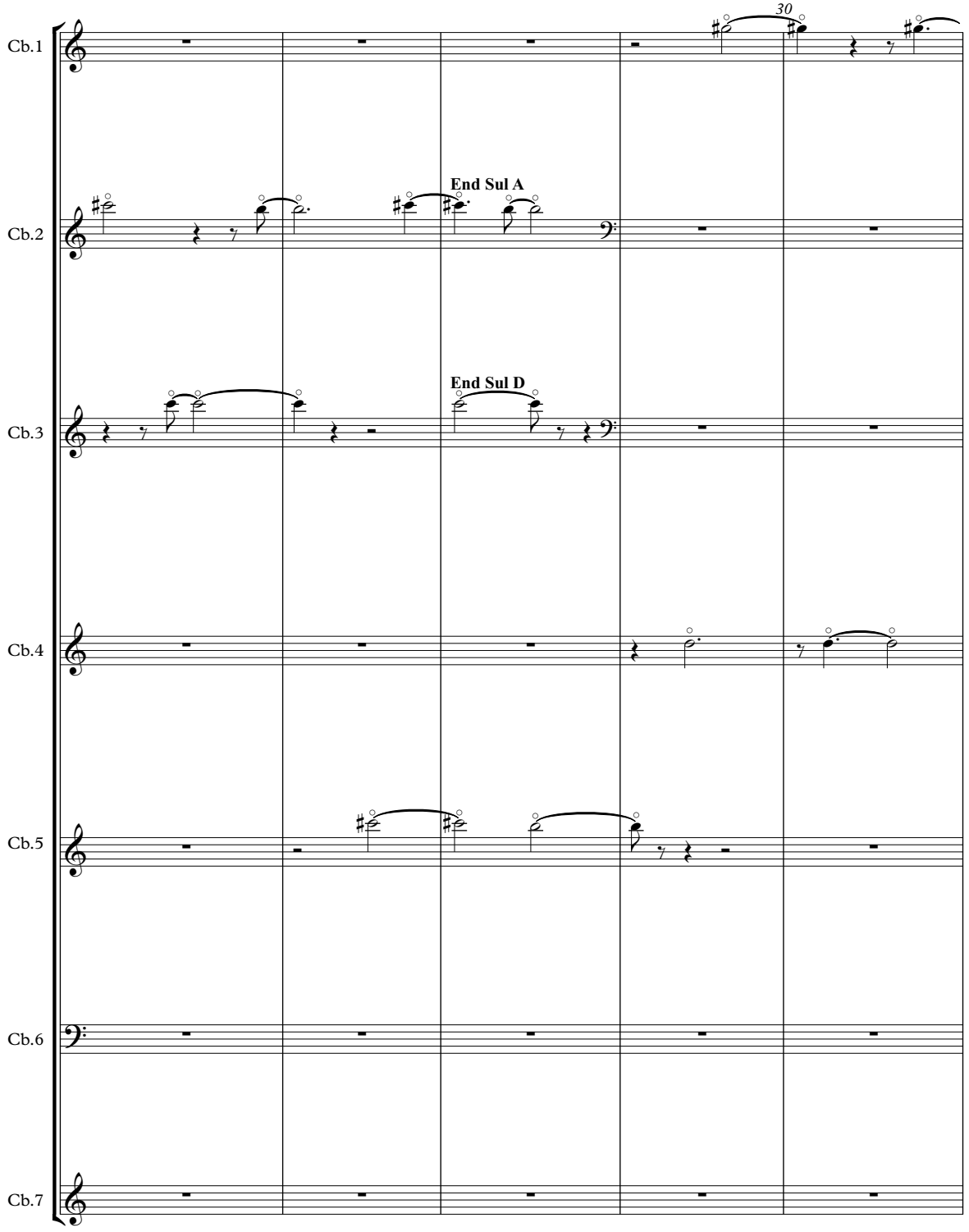


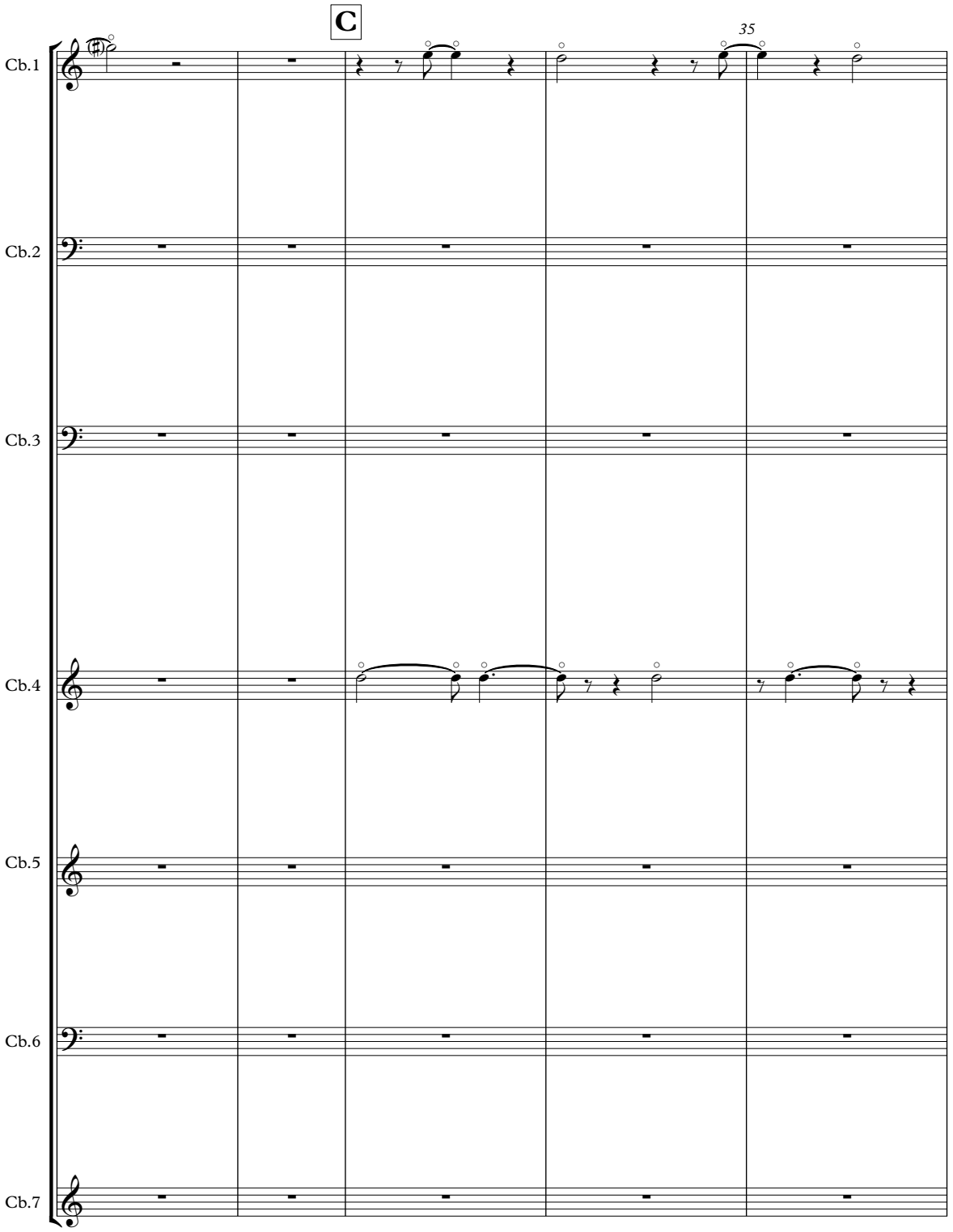

whispering
5
End Sul E
p
Cb.1
End Sul D
Sul A
p
Cb.2
p
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7

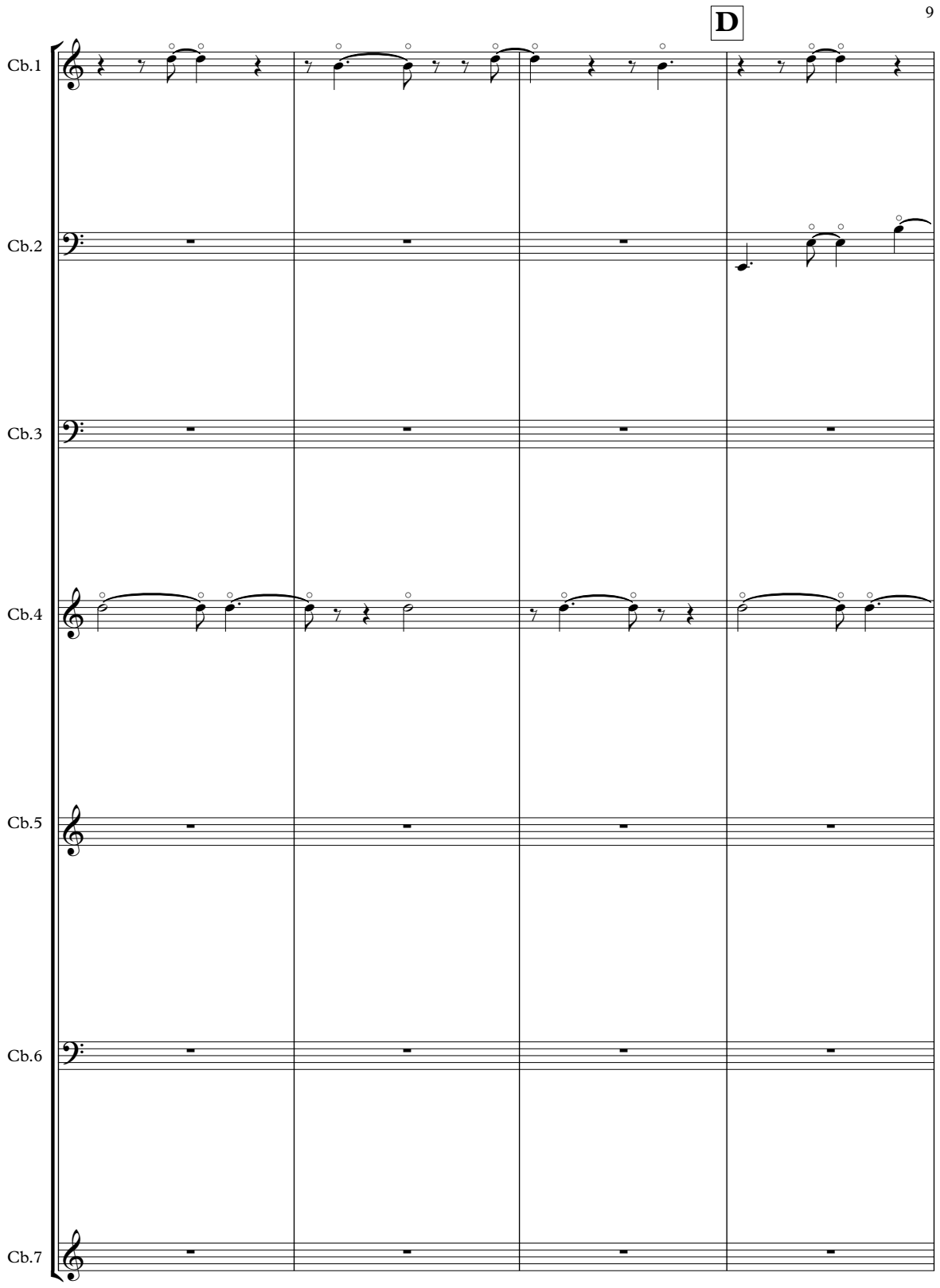

10 Sul A
End Sul A
A
Sul E
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7
p

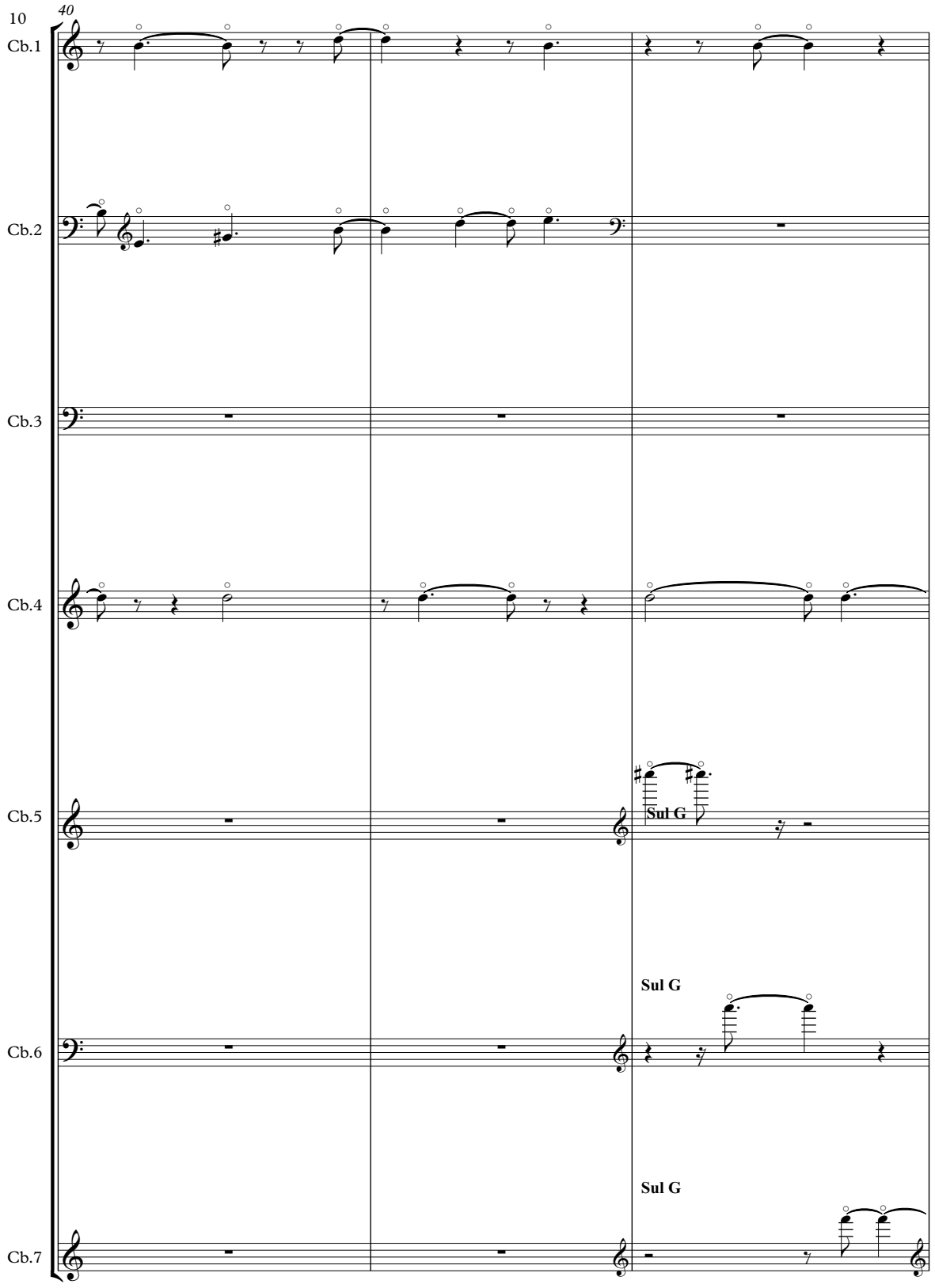

15
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7
End Sul G
Sul A/end Sul A

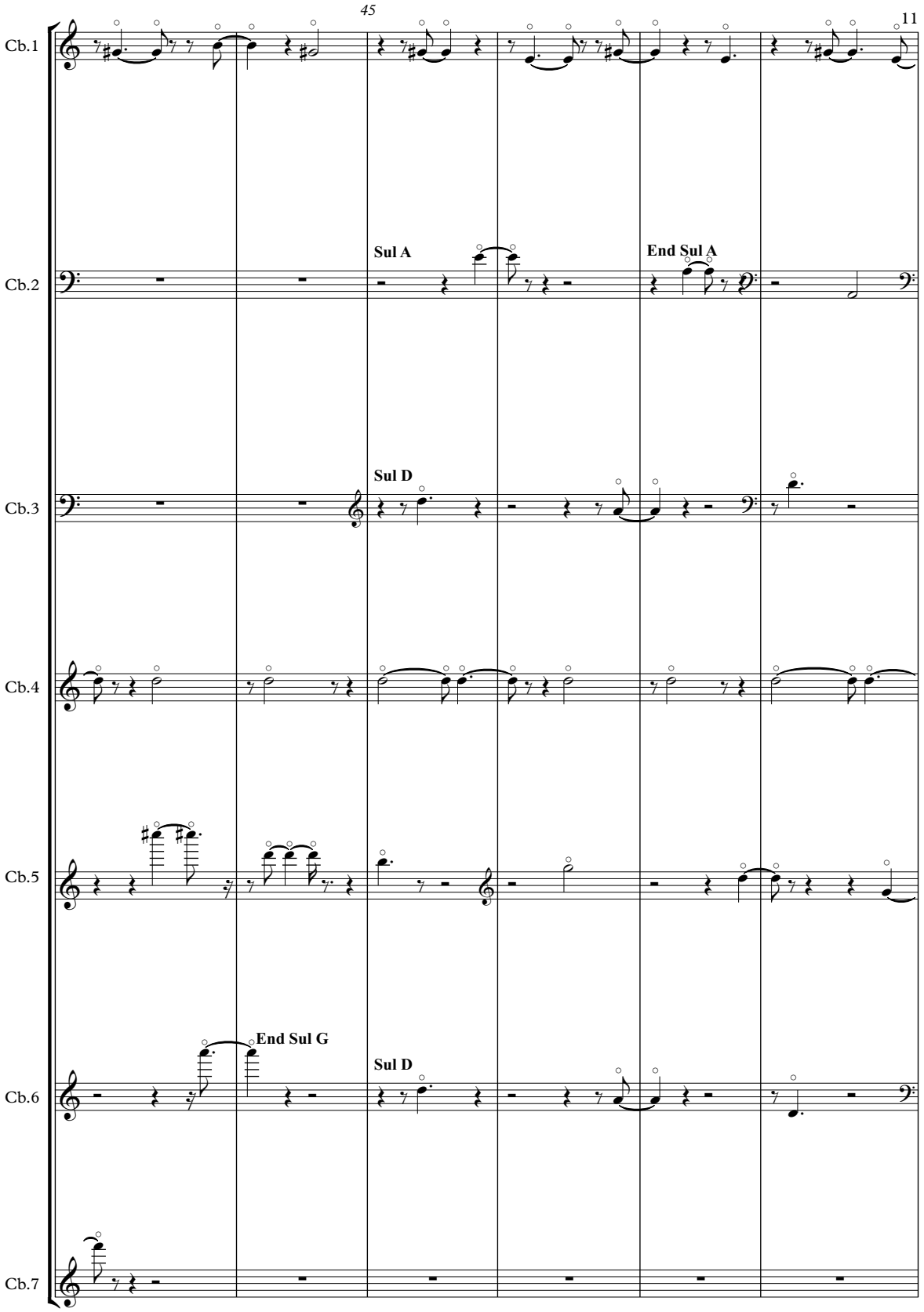

B
20
25
Cb.1
Cb.2
Cb.3
Sul A/End Sul A
Sul G
Cb.4
Sul A/End Sul A
Cb.5
Cb.6
Cb.7

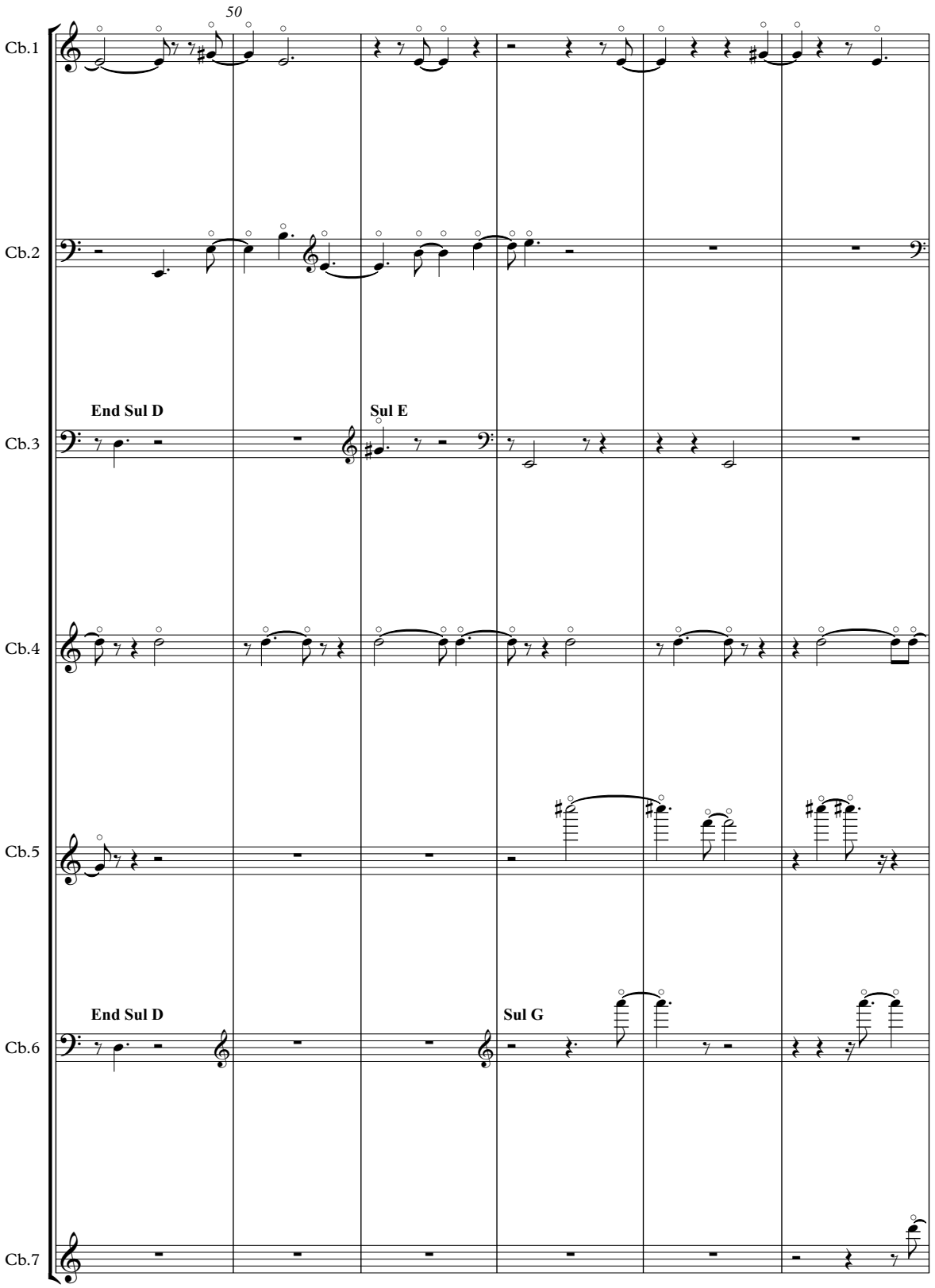

30
Cb.1
Cb.2
End Sul A
Cb.3
End Sul D
Cb.4
Cb.5
Cb.6
Cb.7

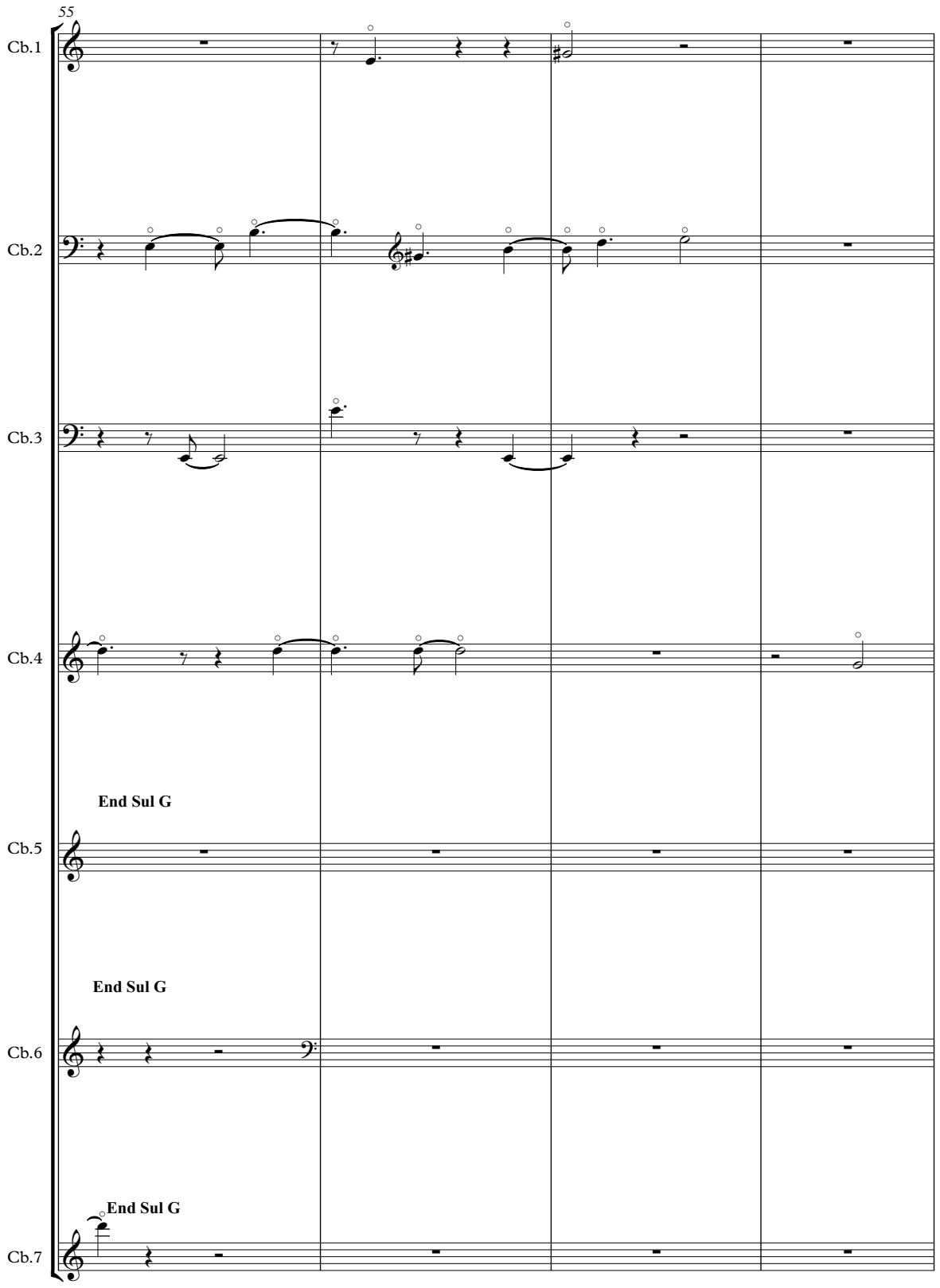

C
35
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7

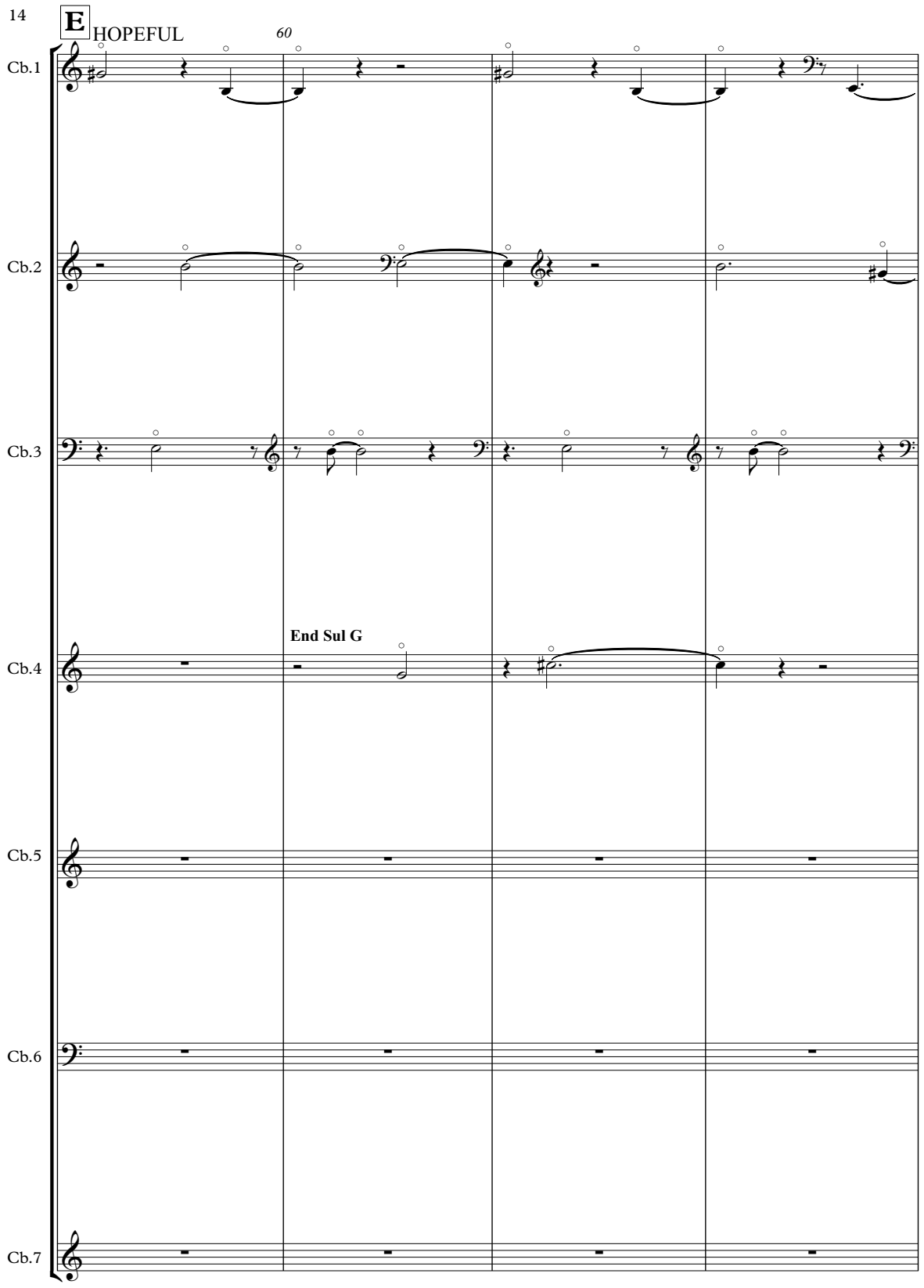

D
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7


10
40
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Sul G
Cb.6
Sul G
Cb.7
Sul G

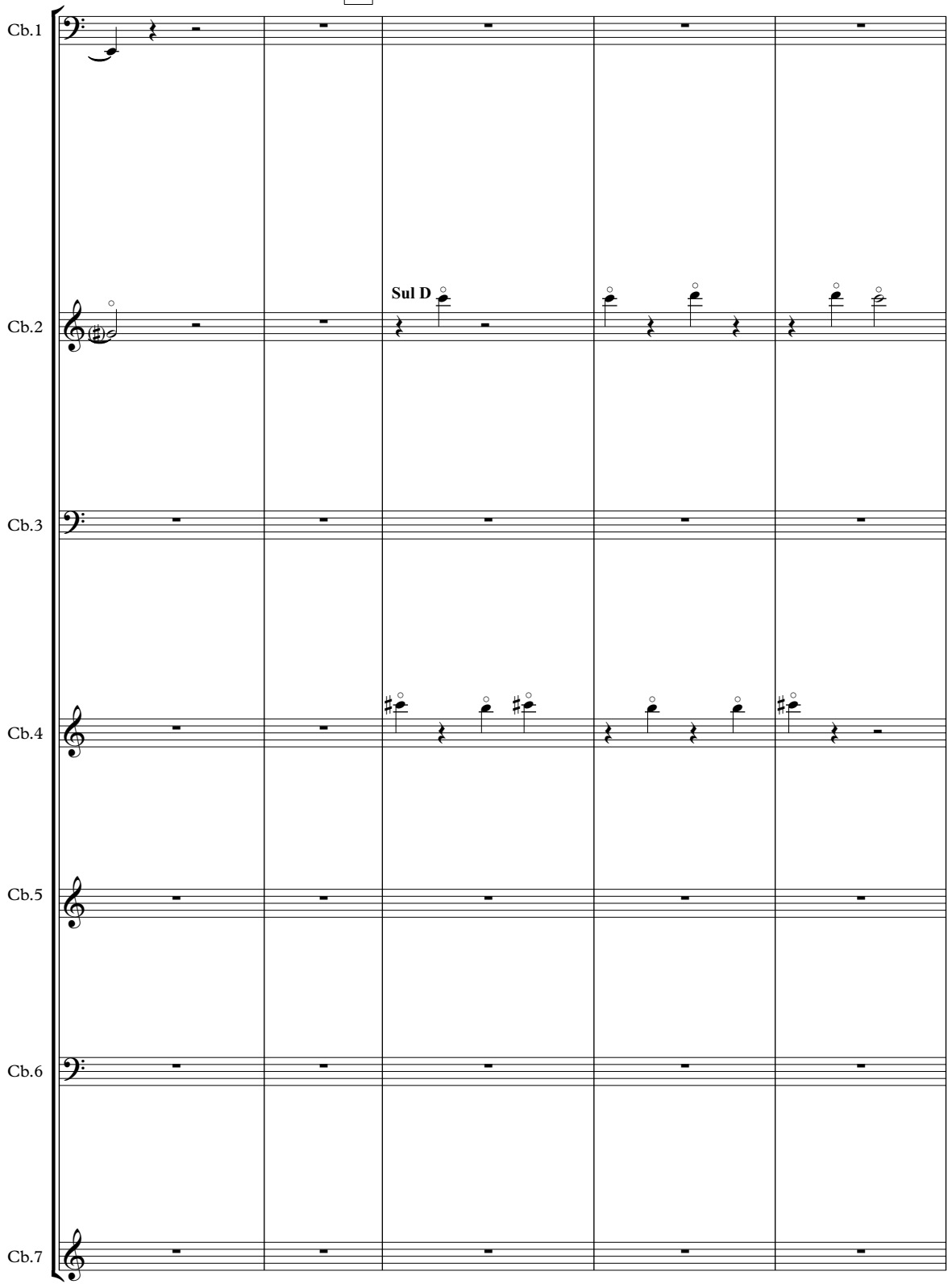

45
11
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7
Sul A
End Sul A
Sul D
End Sul G
Sul D


50
Cb.1
Cb.2
End Sul D
Sul E
Cb.3
Cb.4
Cb.5
End Sul D
Sul G
Cb.6
Cb.7


55
Cb.1
Cb.2
Cb.3
Cb.4
End Sul G
Cb.5
End Sul G
Cb.6
End Sul G
Cb.7


14
E
HOPEFUL
60
Cb.1
Cb.2
Cb.3
End Sul G
Cb.4
Cb.5
Cb.6
Cb.7

F *65* THE LABERYNTH



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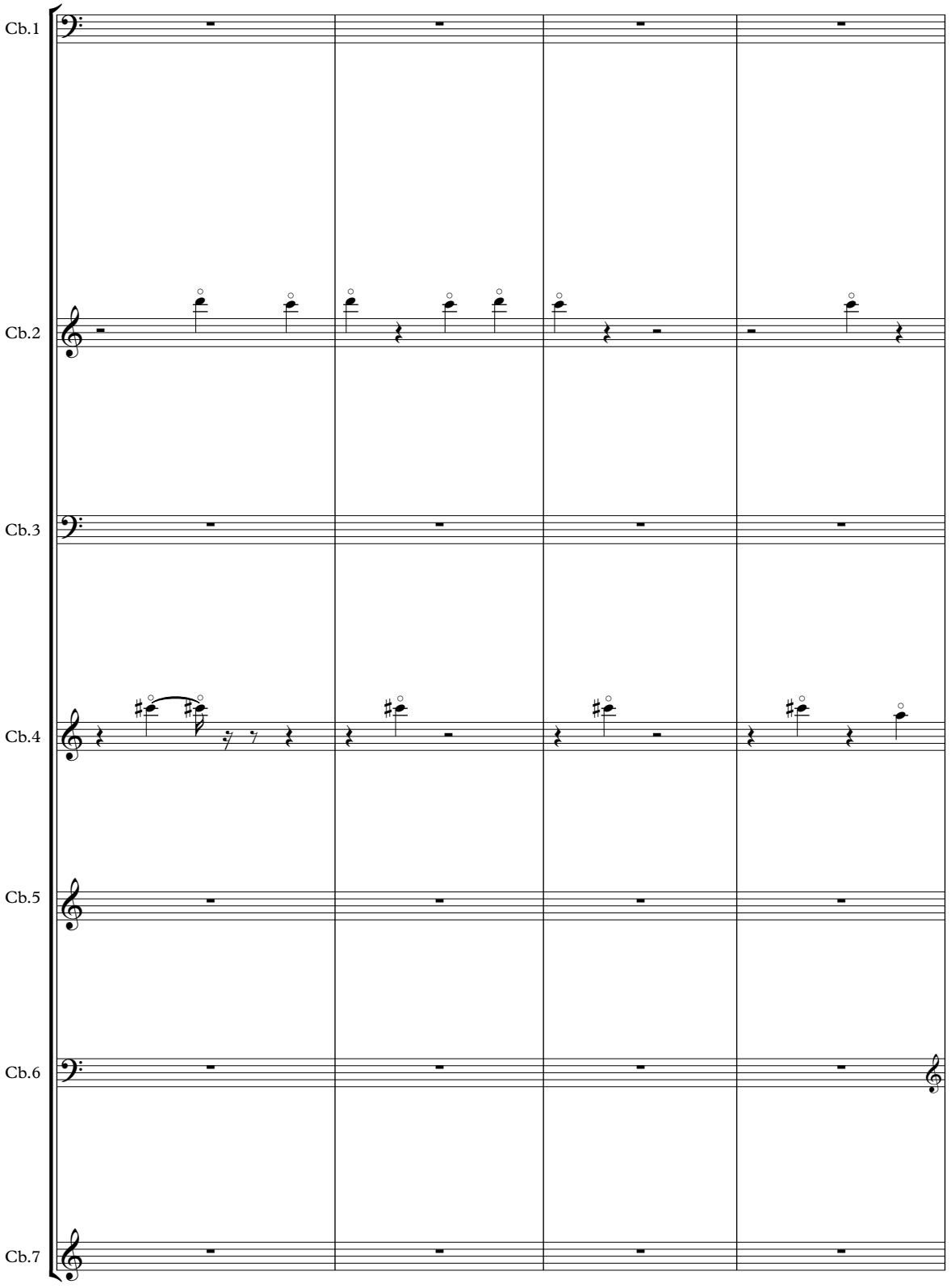
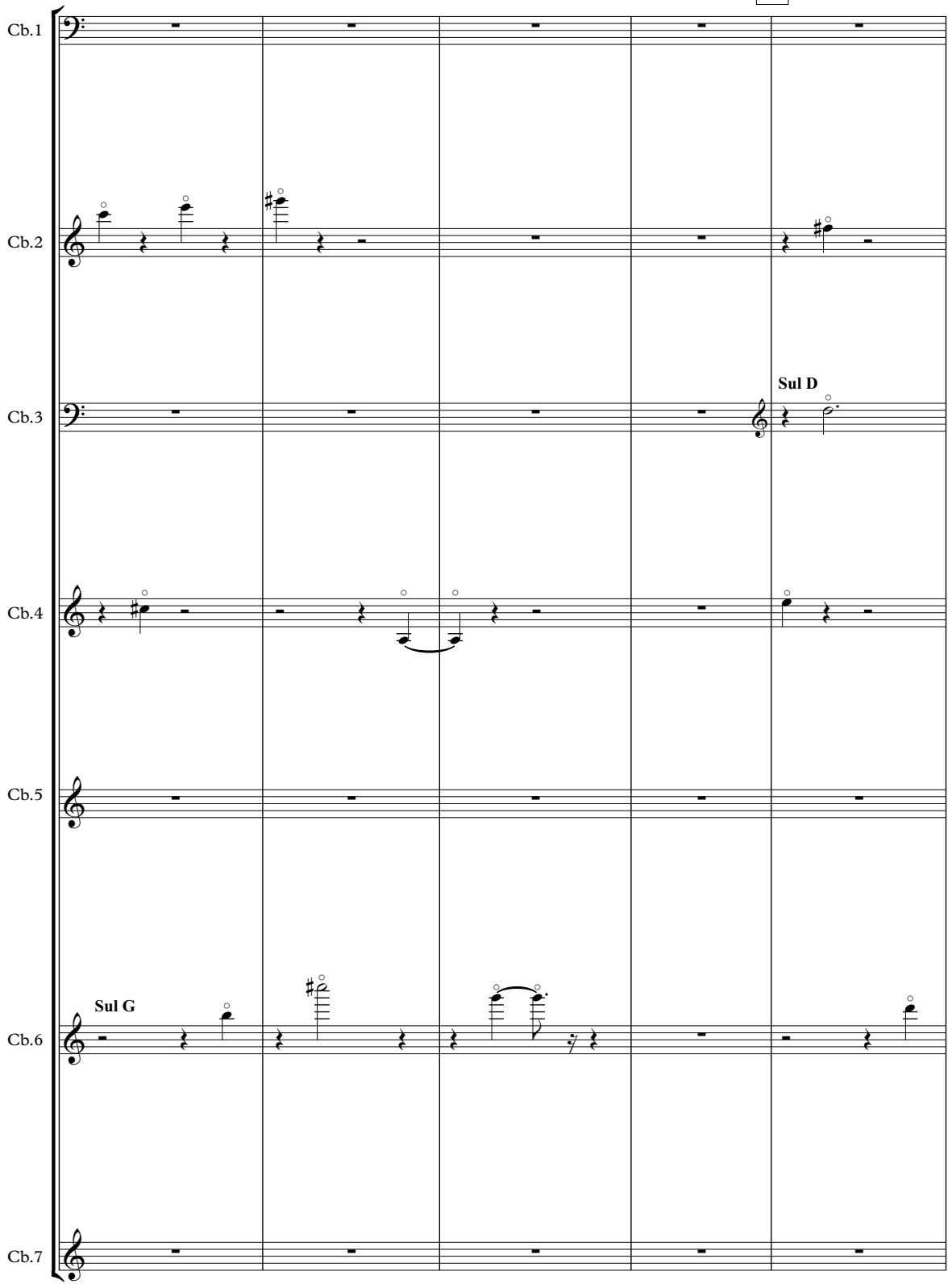
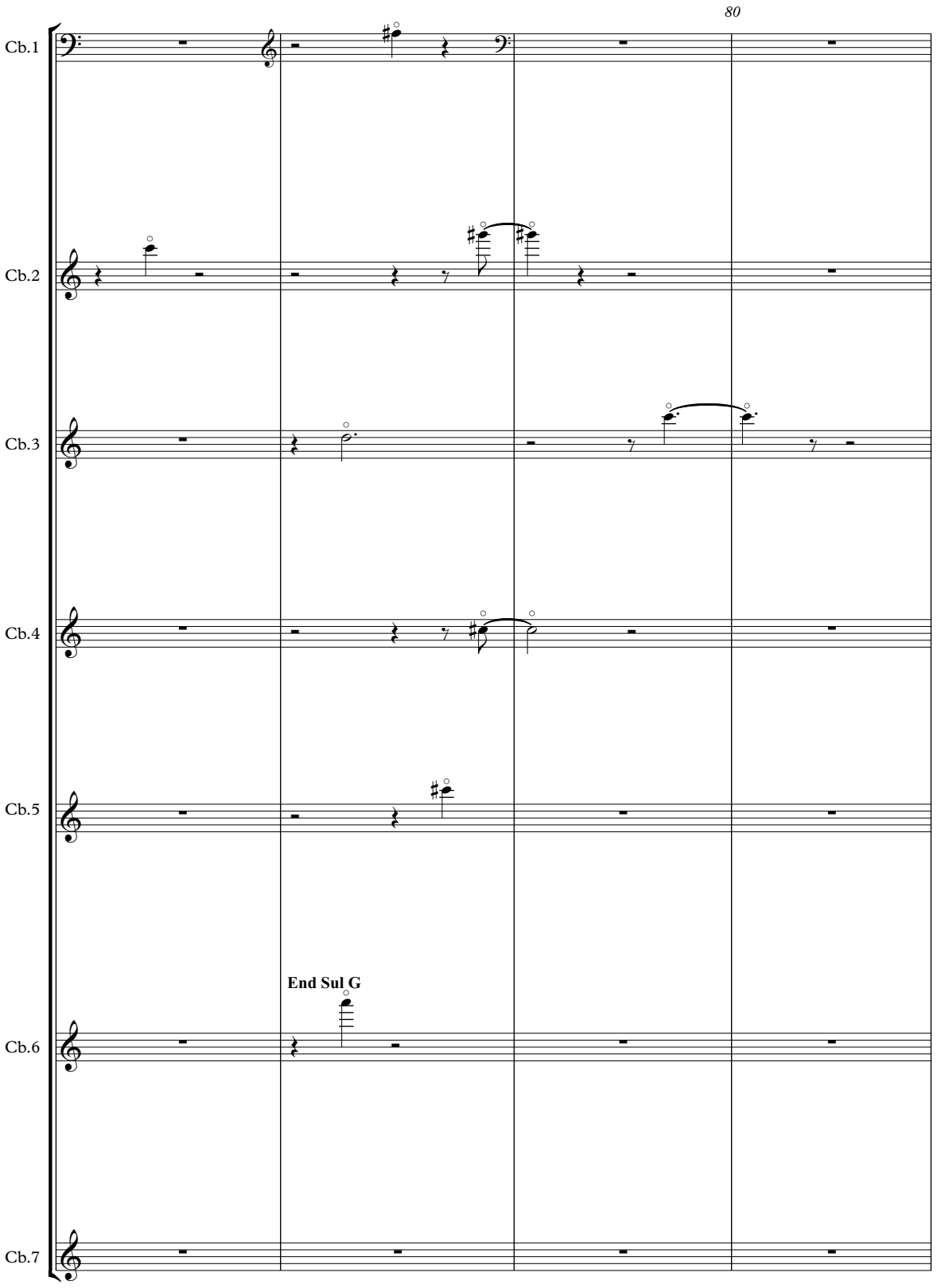
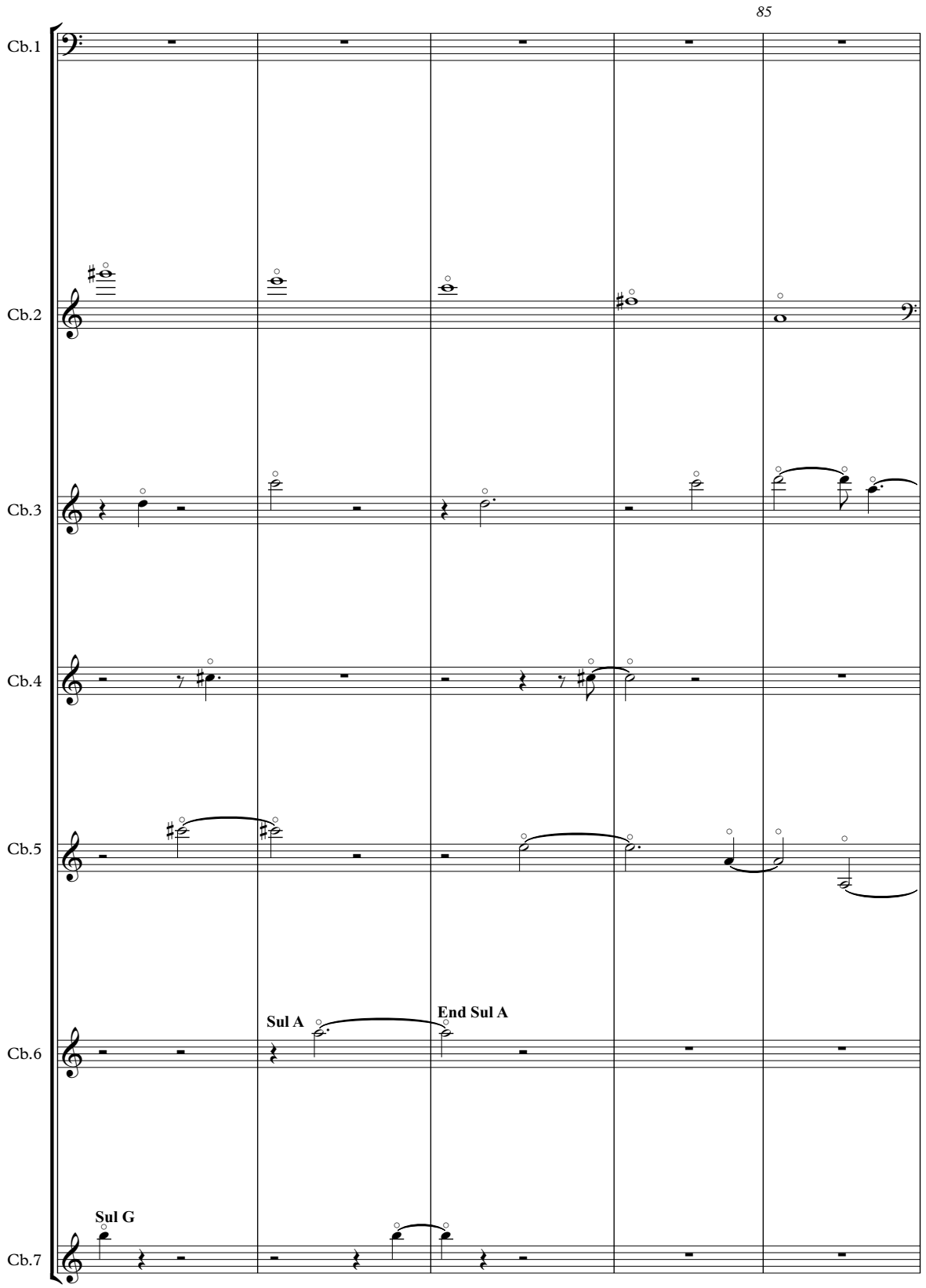


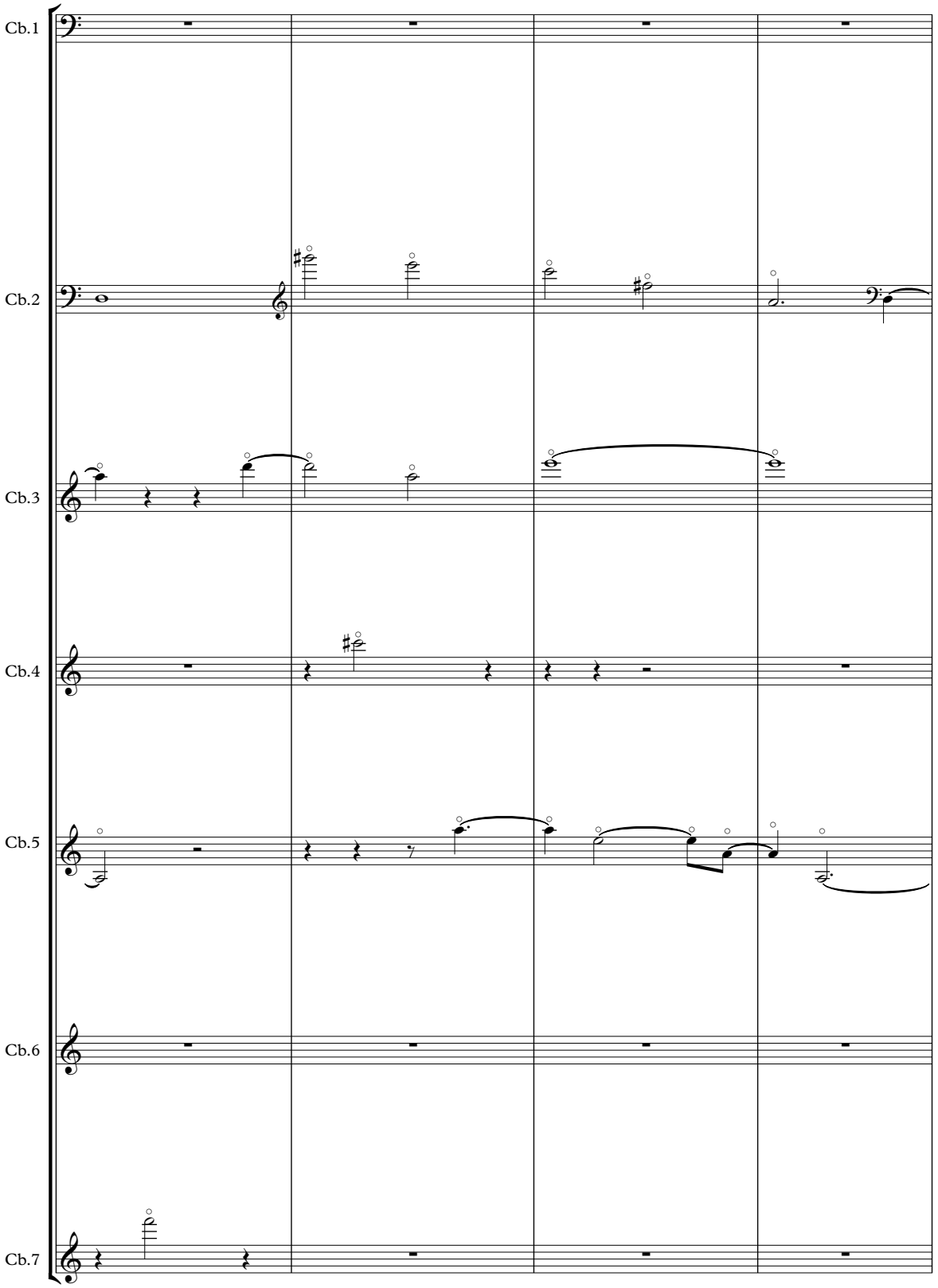
75

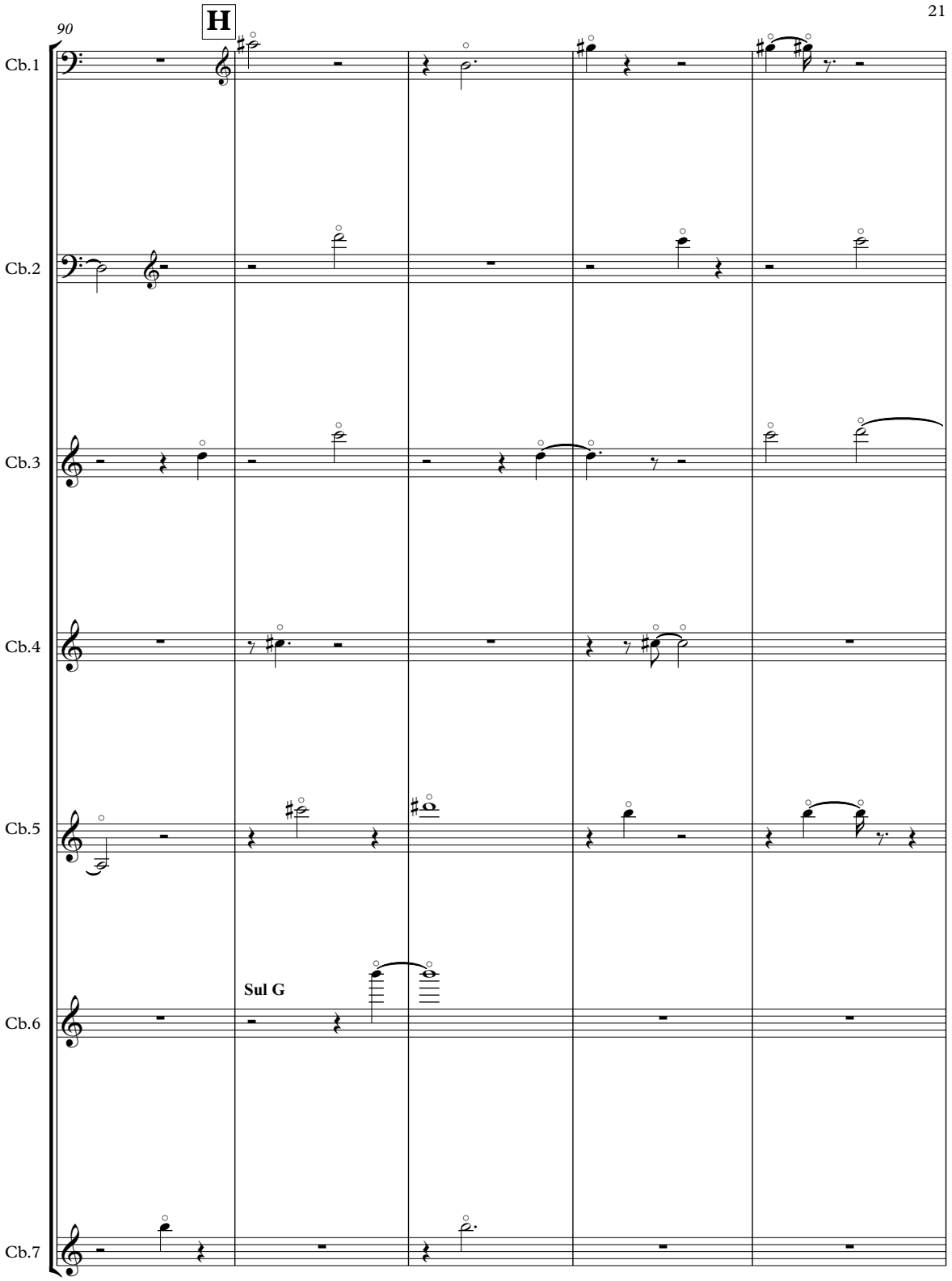
G

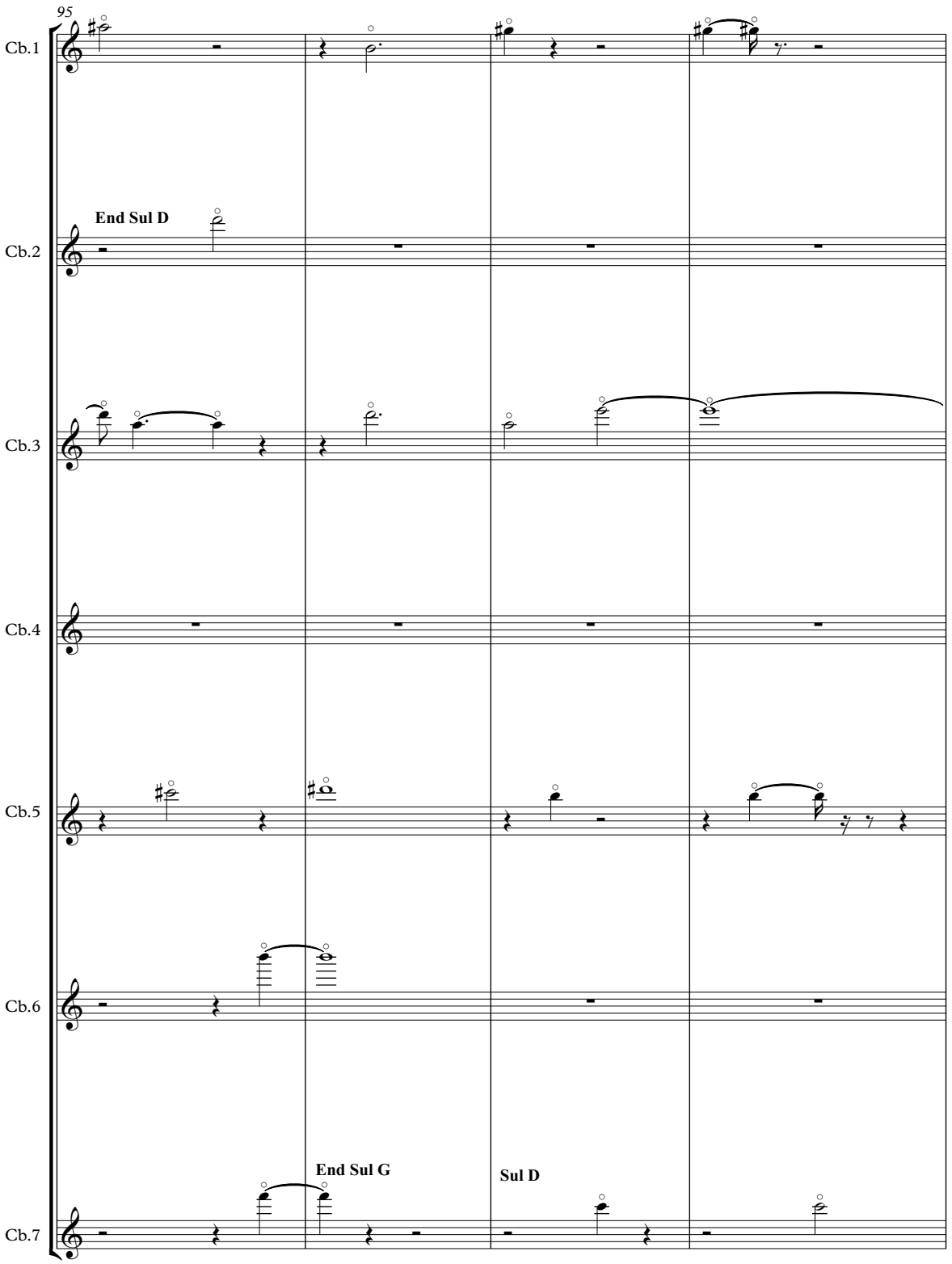


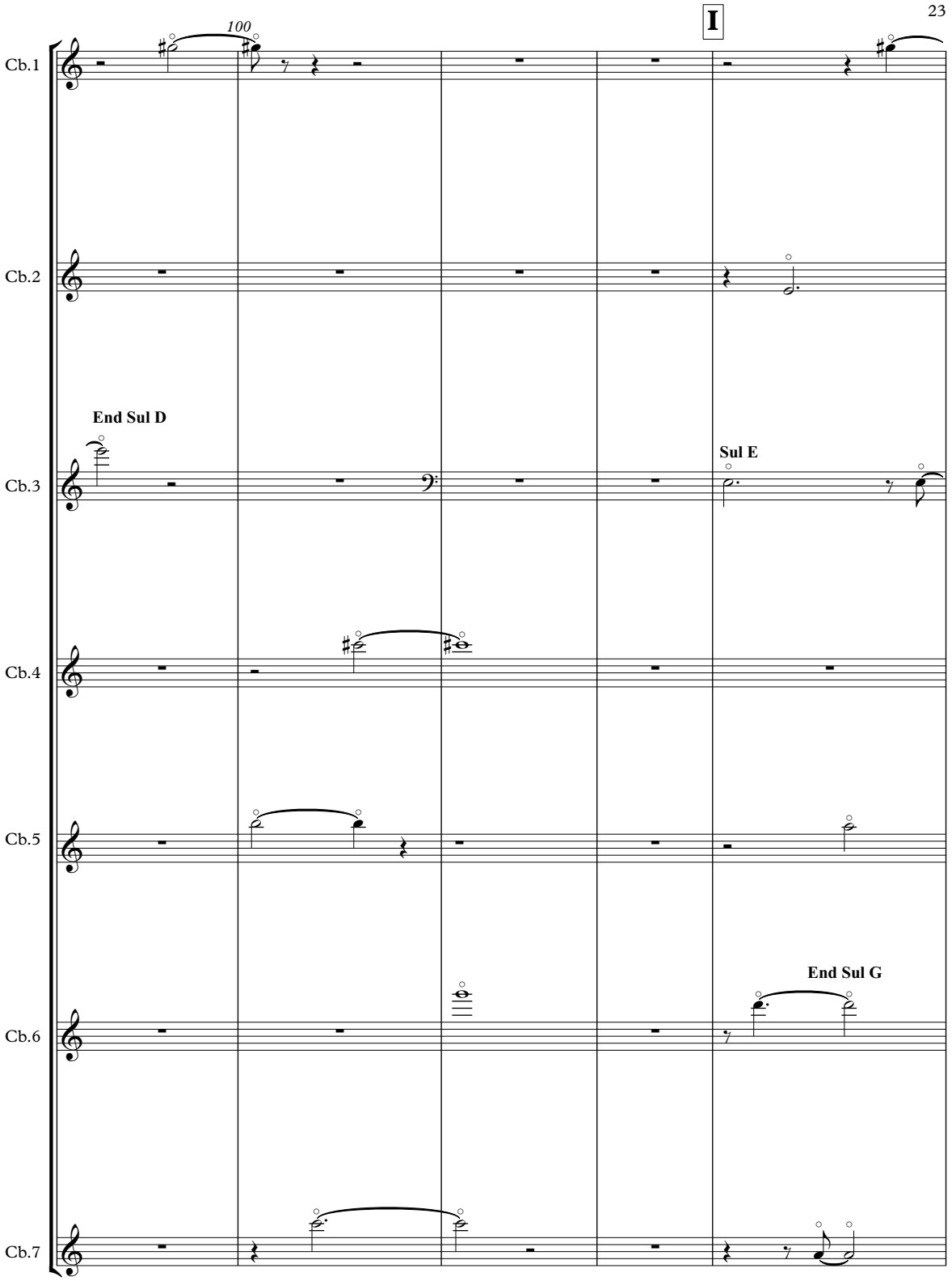

80
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
End Sul G
Cb.6
Cb.7

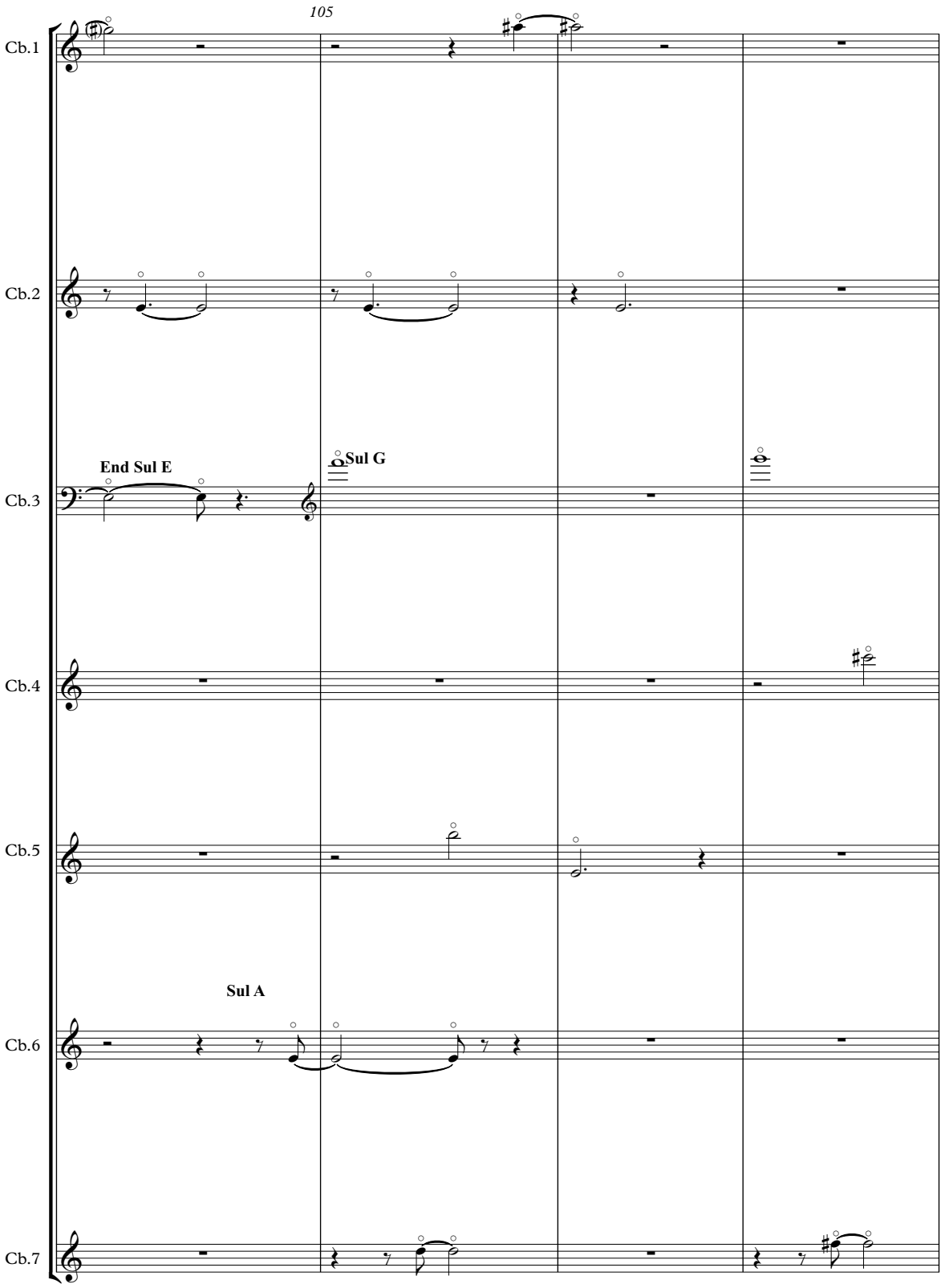

85
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Sul A
End Sul A
Cb.6
Sul G
Cb.7

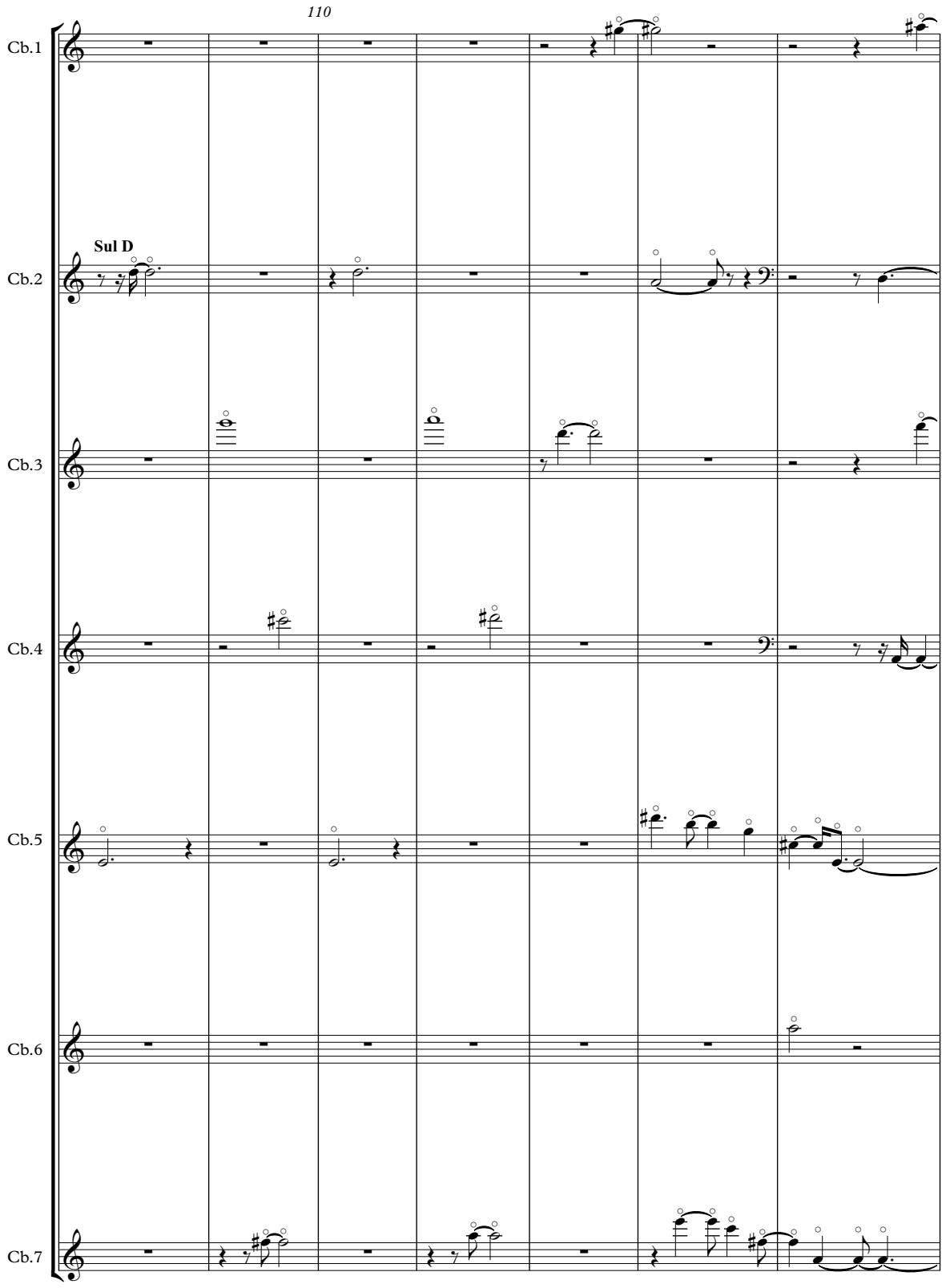

Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7

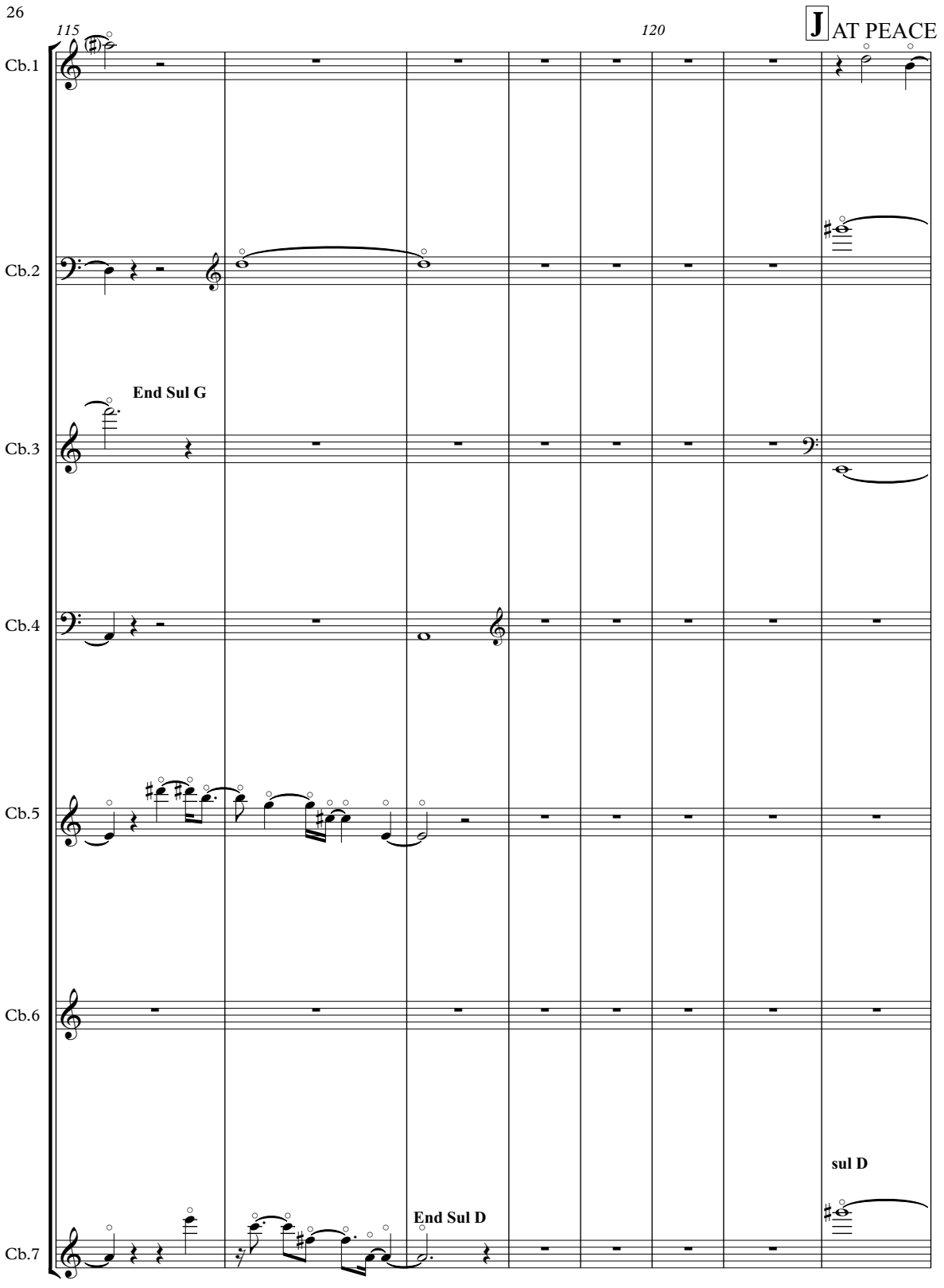

90
H
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Sul G
Cb.6
Cb.7

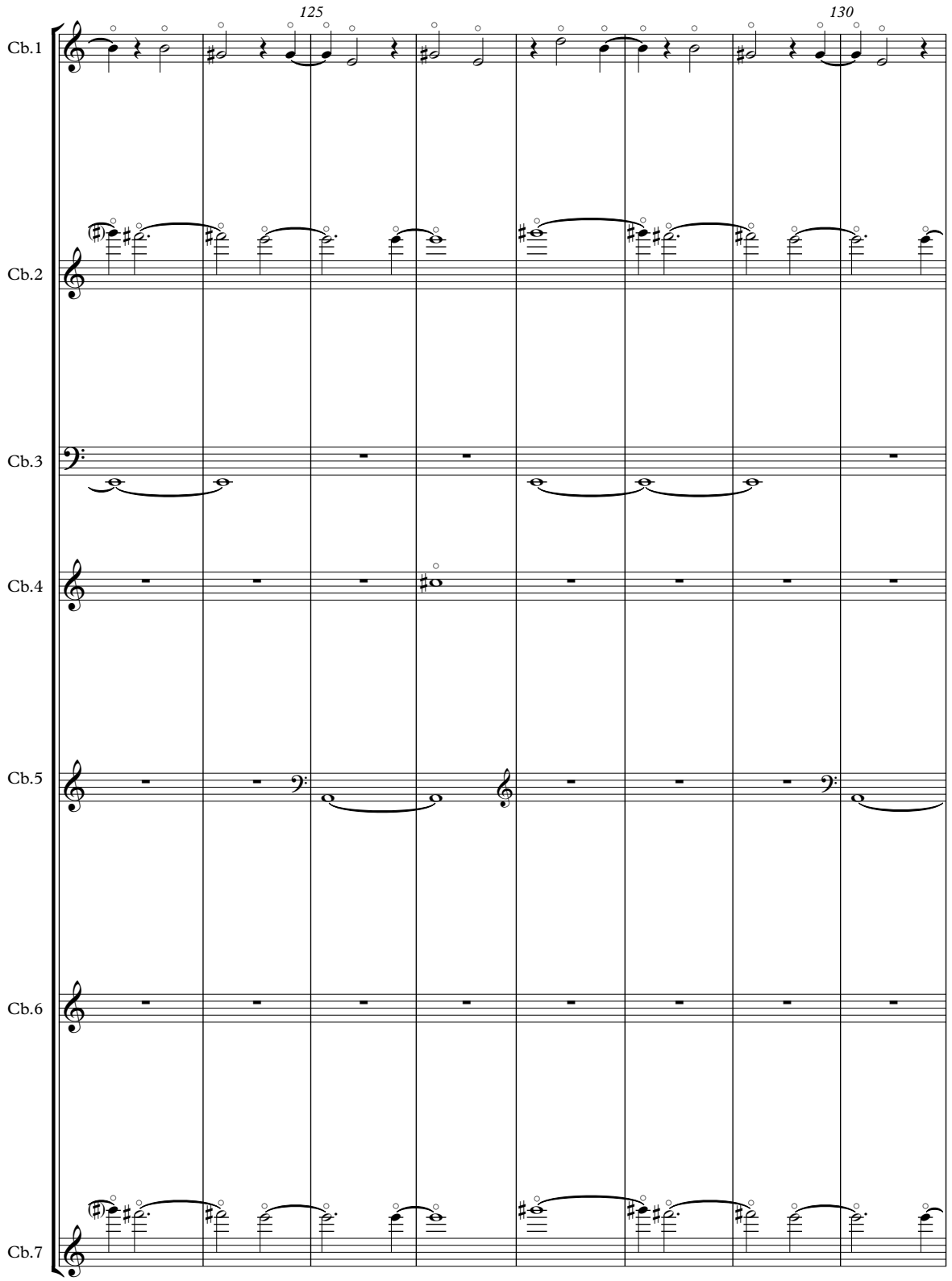

95
Cb.1
End Sul D
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
End Sul G
Sul D
Cb.7

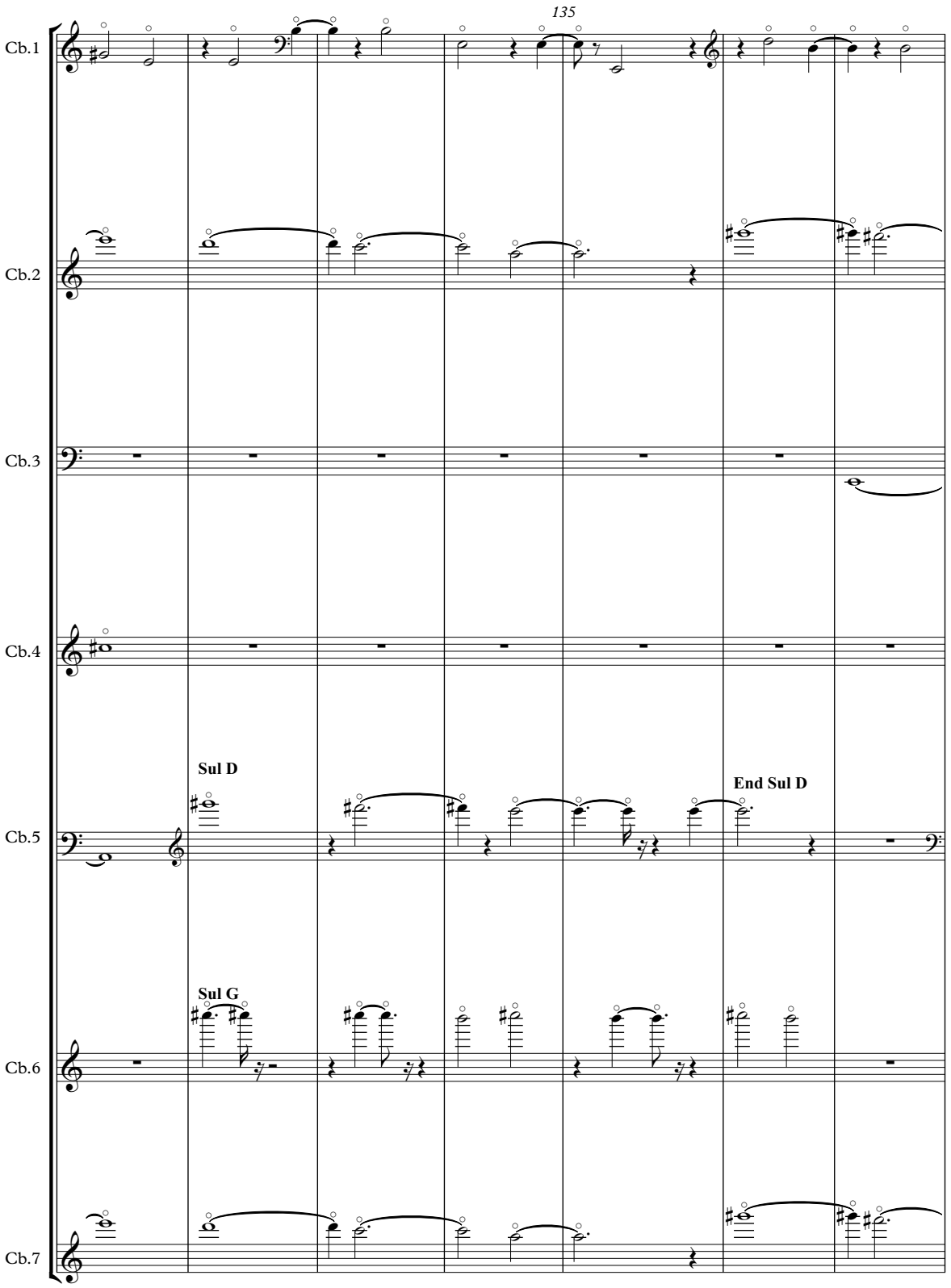

I
100
Cb.1
Cb.2
End Sul D
Sul E
Cb.3
Cb.4
Cb.5
End Sul G
Cb.6
Cb.7

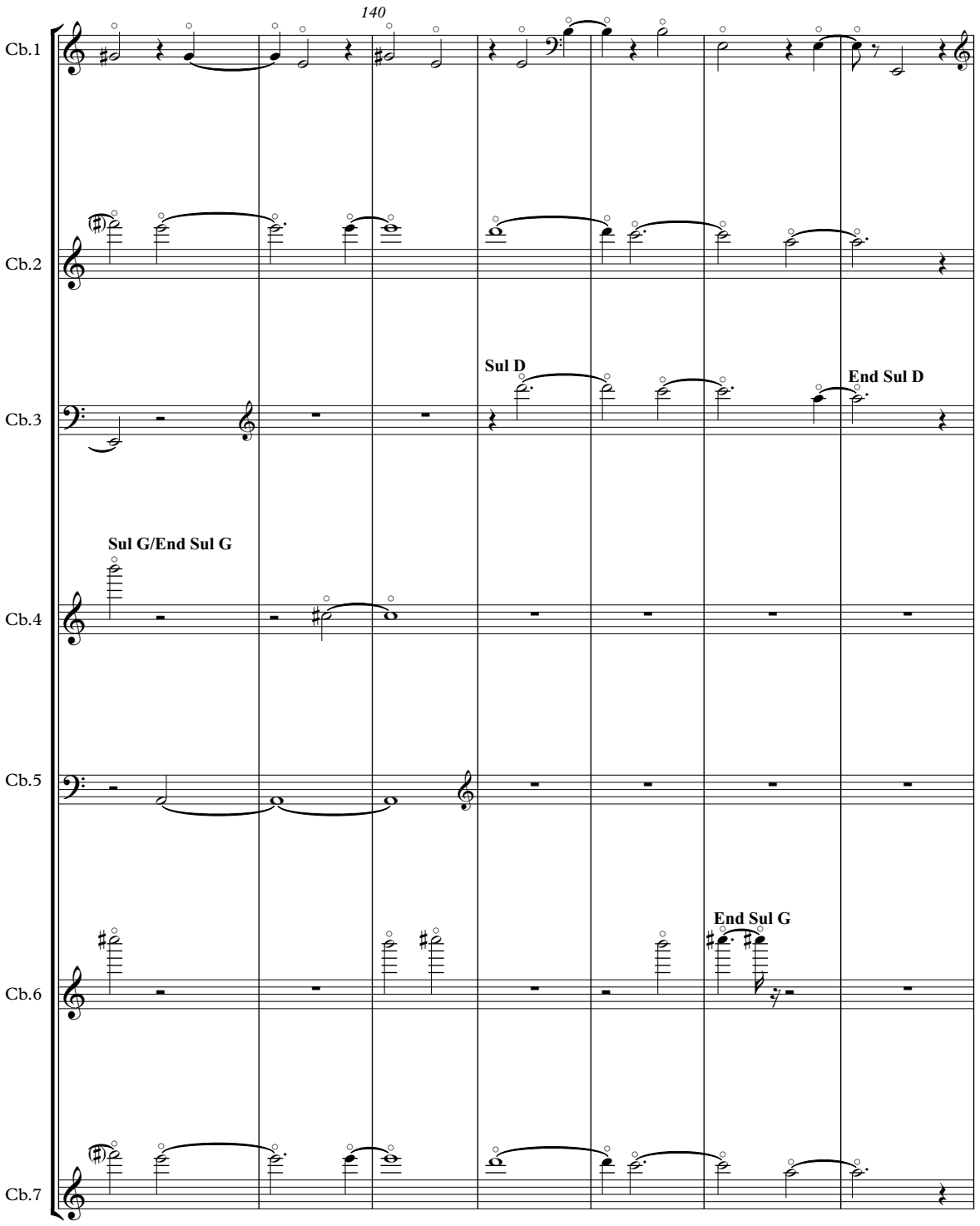

105
Cb.1
Cb.2
End Sul E
Sul G
Cb.3
Cb.4
Cb.5
Sul A
Cb.6
Cb.7

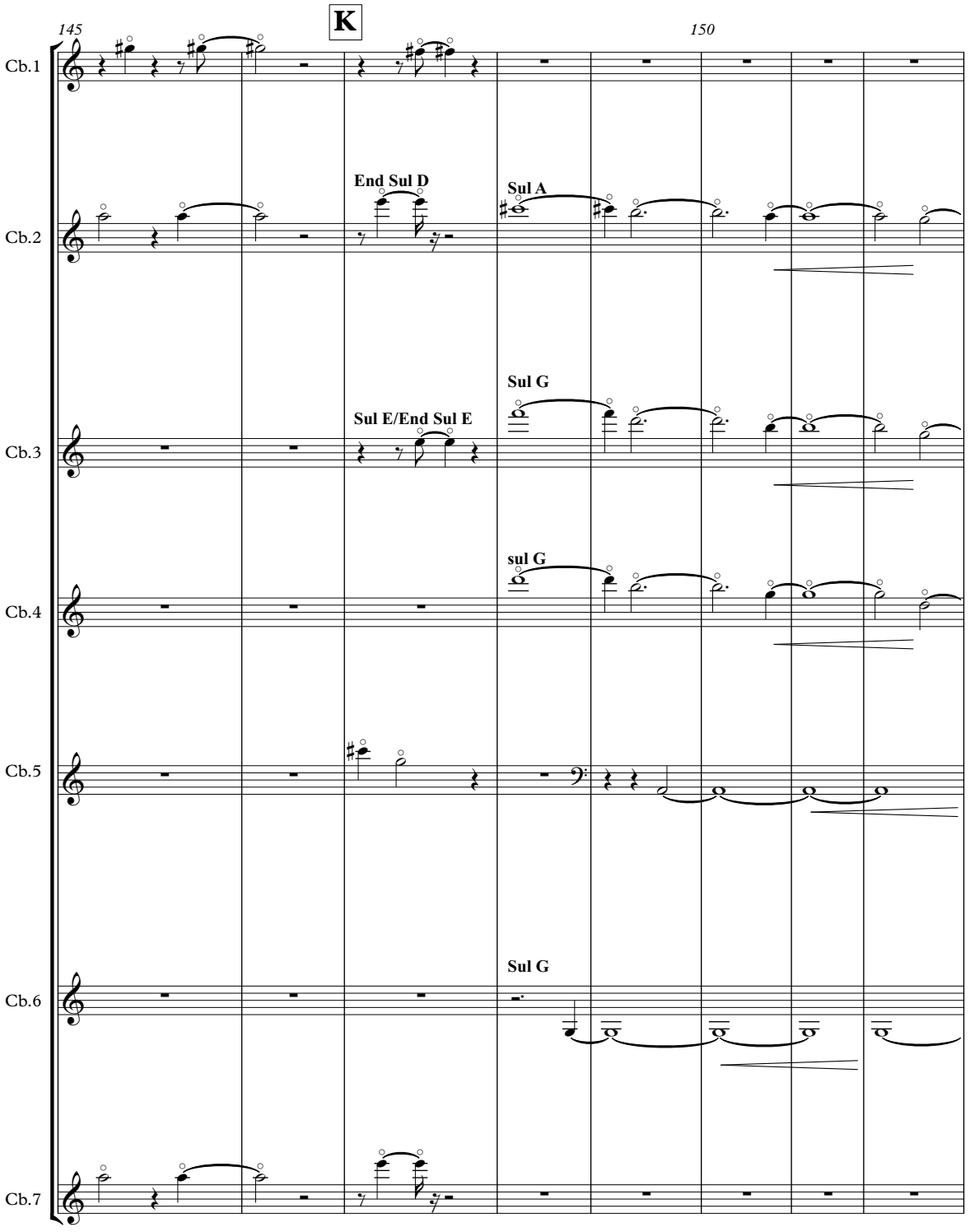

110
Cb.1
Sul D
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7

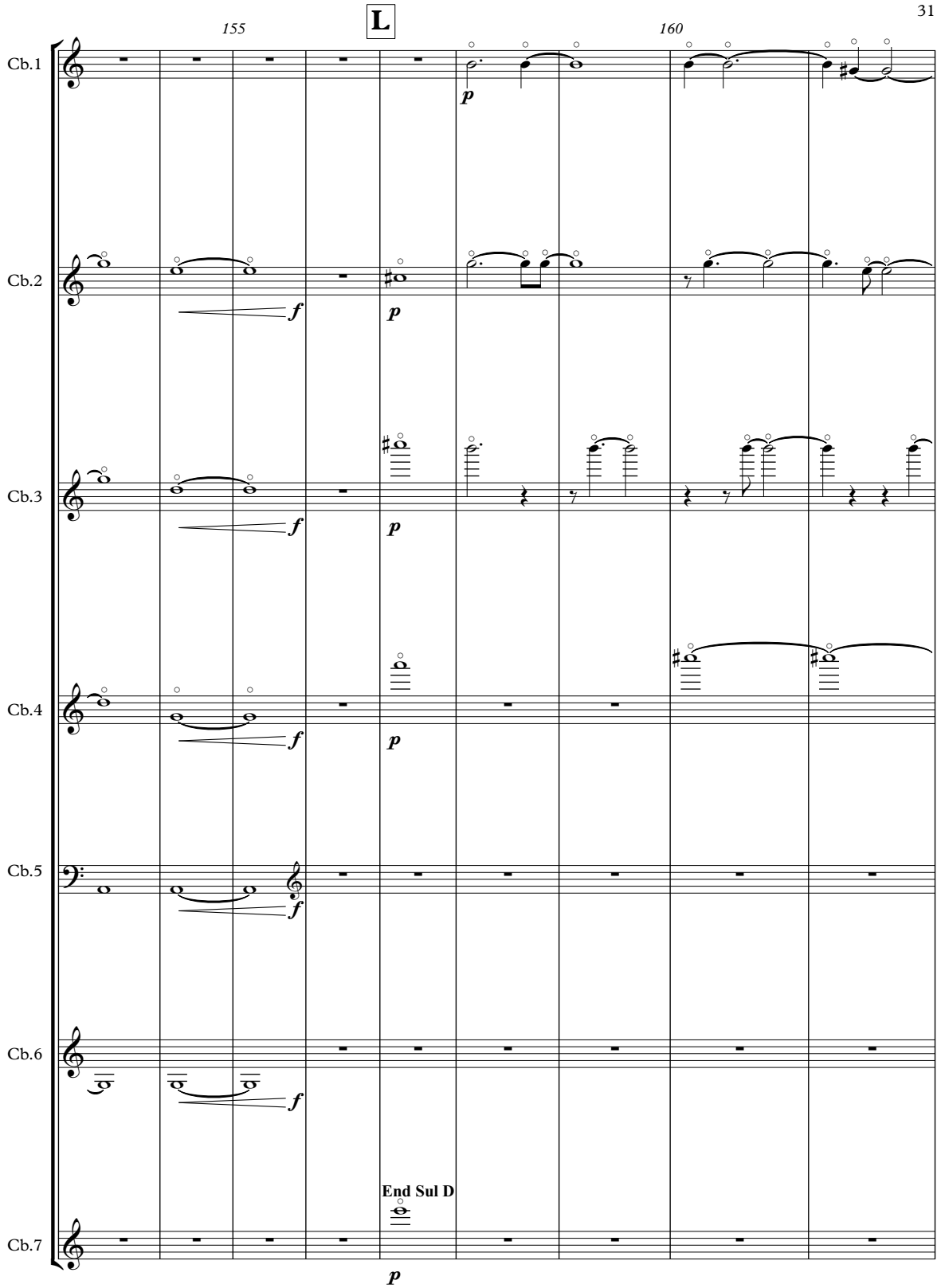

26
115
120
J AT PEACE
Cb.1
Cb.2
End Sul G
Cb.3
Cb.4
Cb.5
Cb.6
sul D
End Sul D
Cb.7

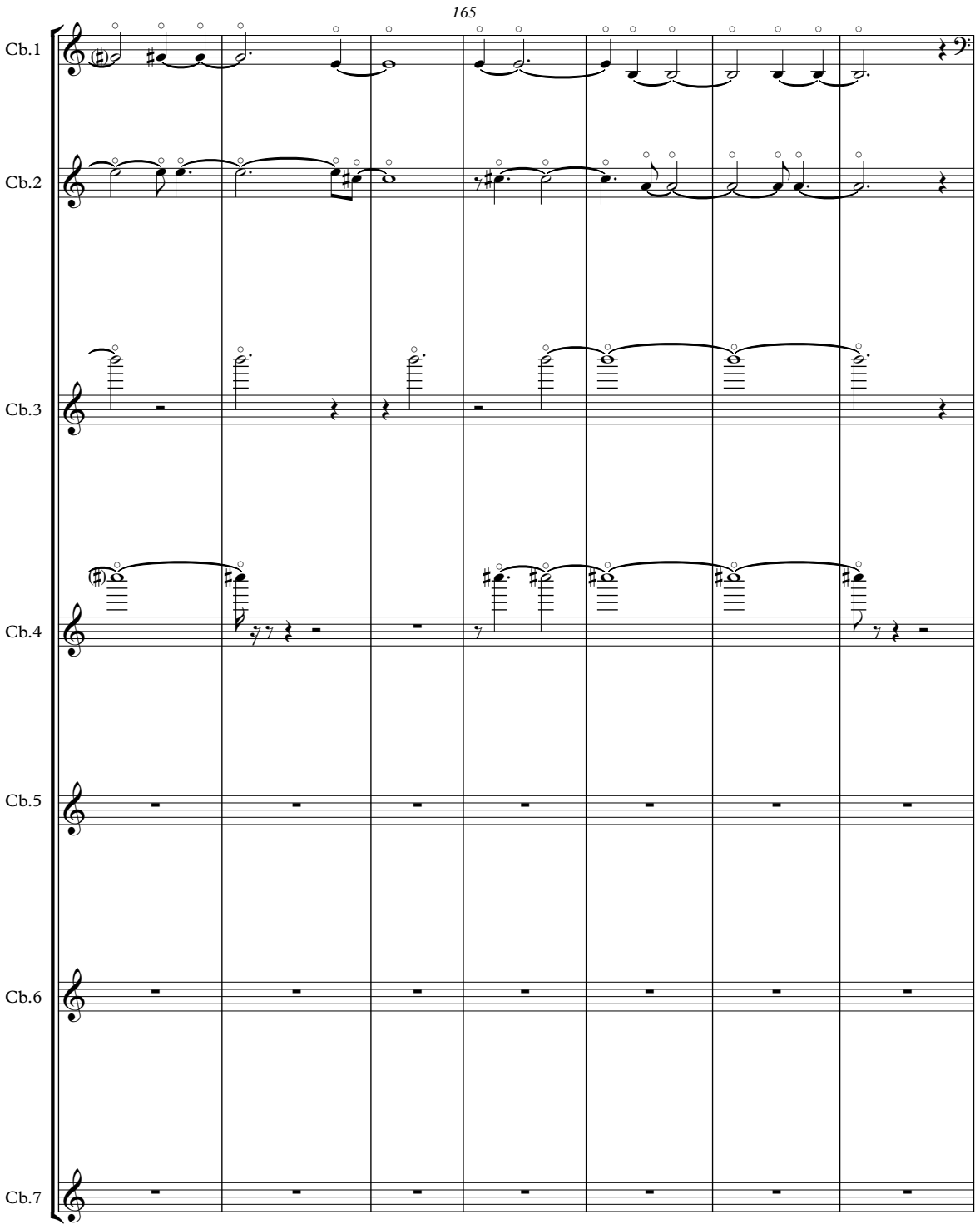

125
130
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7

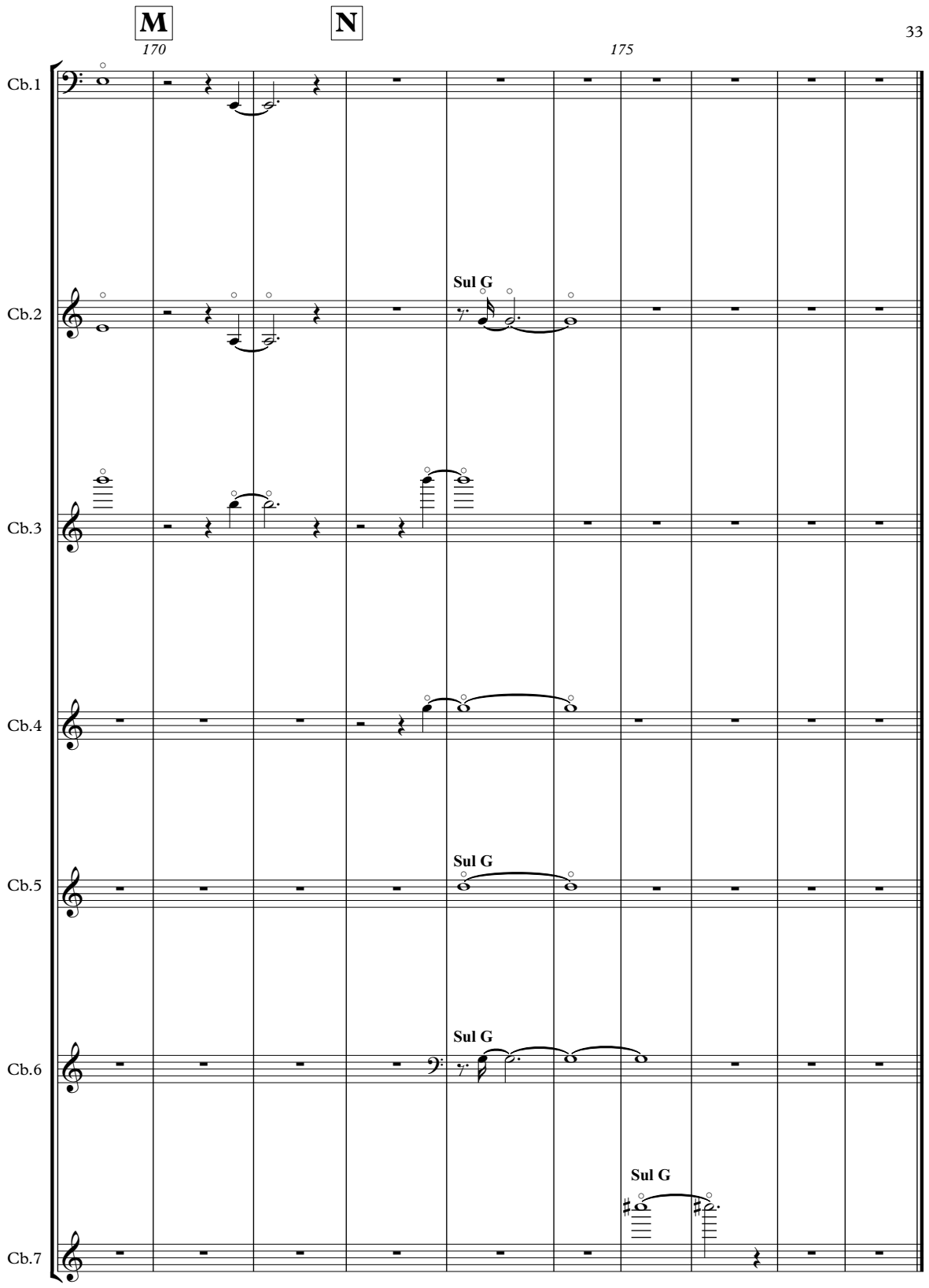

135
Cb.1
Cb.2
Cb.3
Cb.4
Sul D
End Sul D
Cb.5
Sul G
Cb.6
Cb.7


140
Cb.1
Cb.2
Cb.3
Sul D
End Sul D
Sul G/End Sul G
Cb.4
Cb.5
End Sul G
Cb.6
Cb.7


K
145
150
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7
End Sul D
Sul A
Sul G
Sul E/End Sul E
sul G
Sul G


155
L
160
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7
p
f
End Sul D


165
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7


M
N
170
175
Cb.1
Cb.2
Cb.3
Cb.4
Cb.5
Cb.6
Cb.7
Sul G
Sul G
Sul G
Sul G

C.5

Trichromatic (2014)

For Electric Guitar

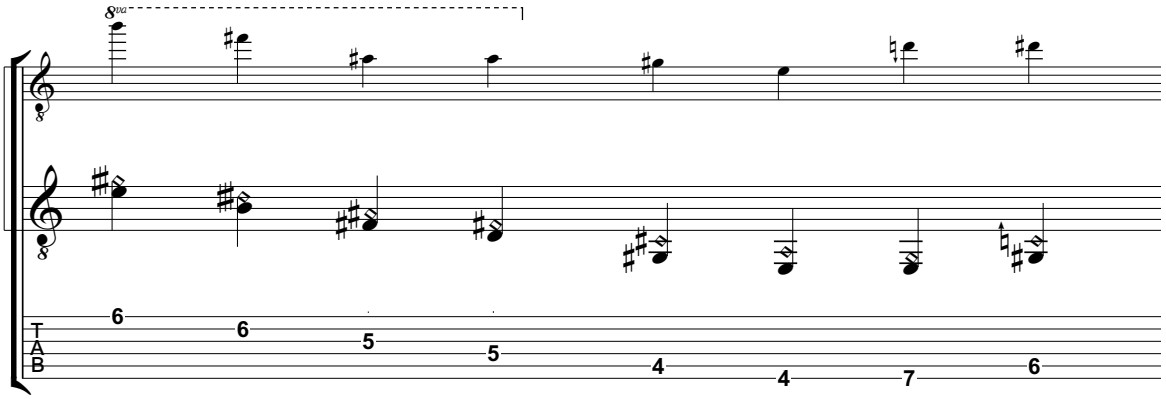
Ori Barel

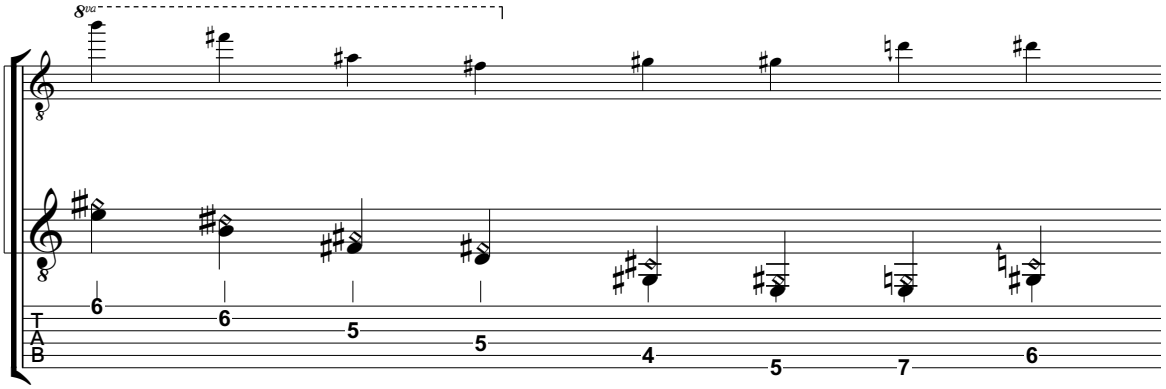
Trichromatic
for electric guitar

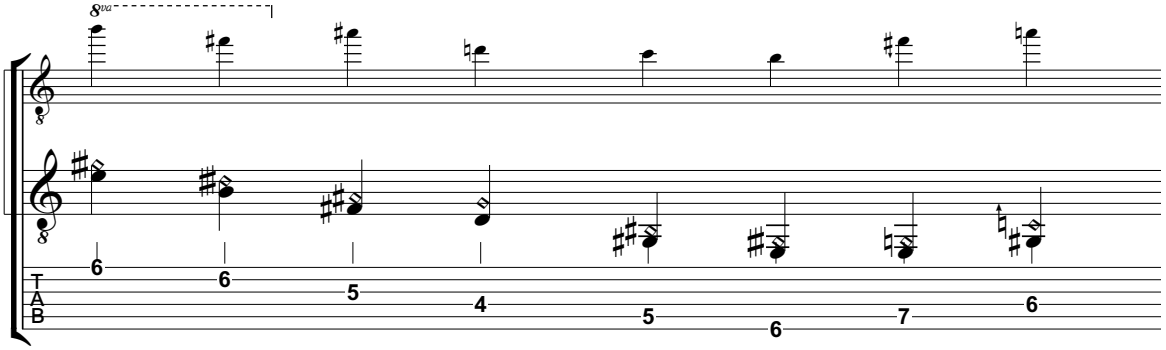
Trichromatic-For Electric Guitar

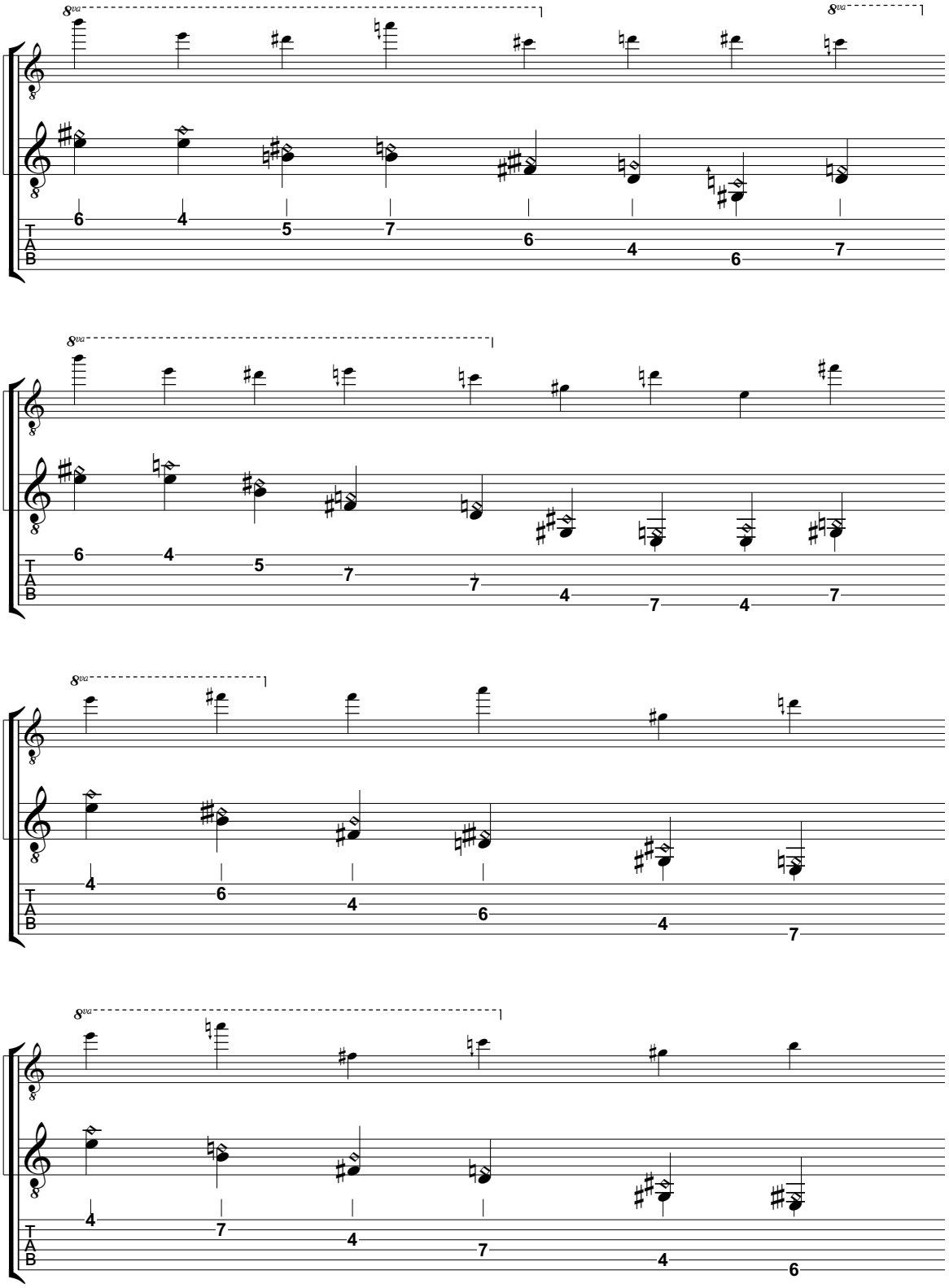
each staff = between 10-25 seconds-rhythms are free

Ori Barel 2015

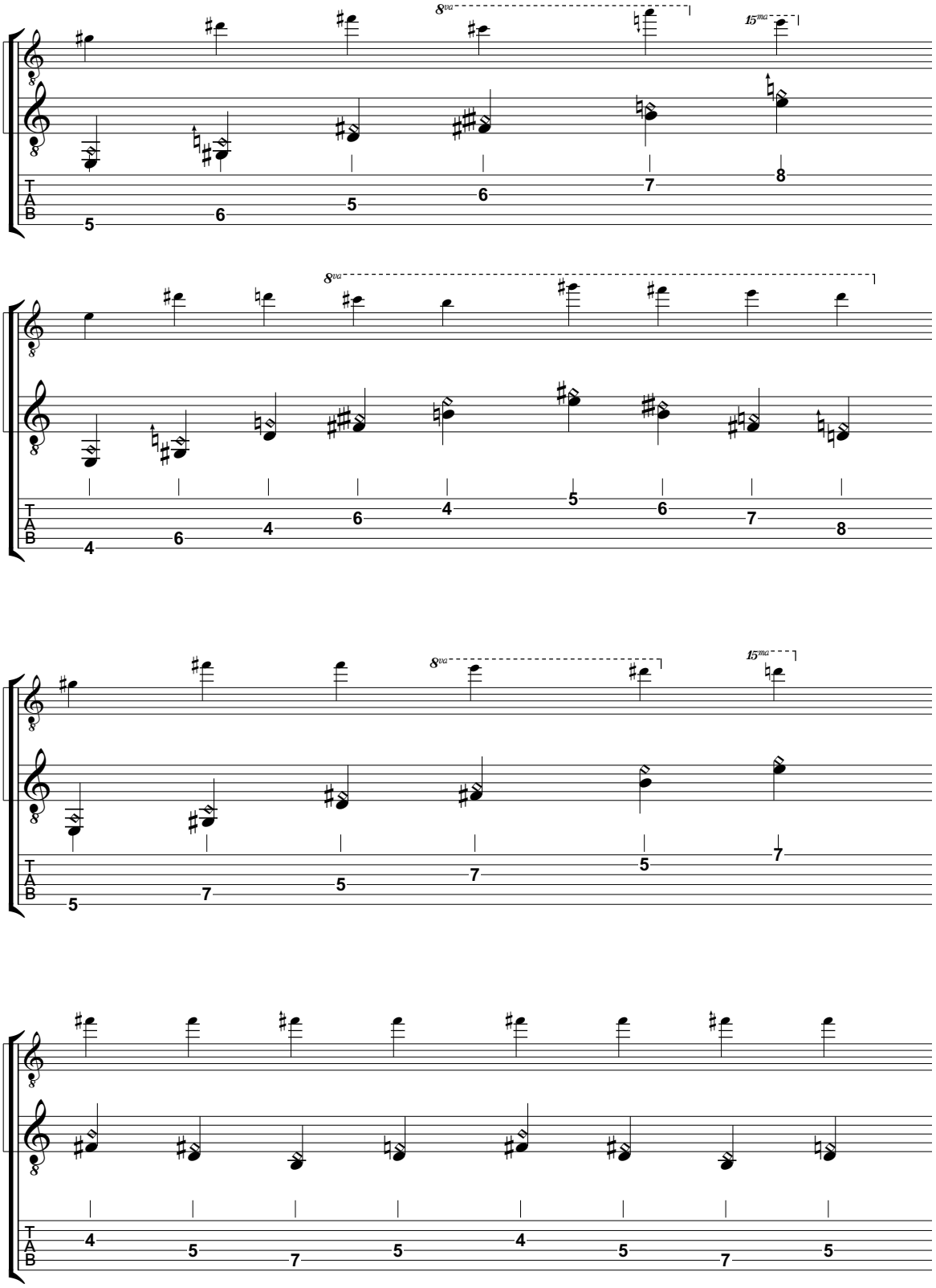


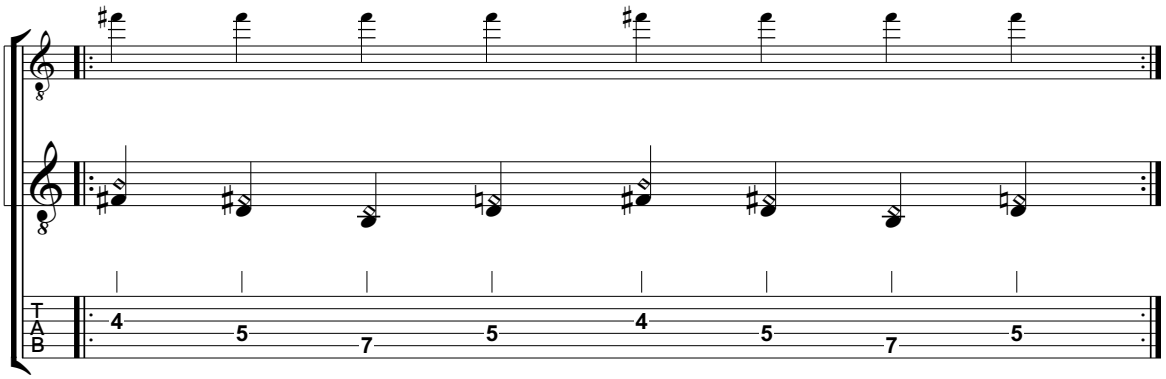


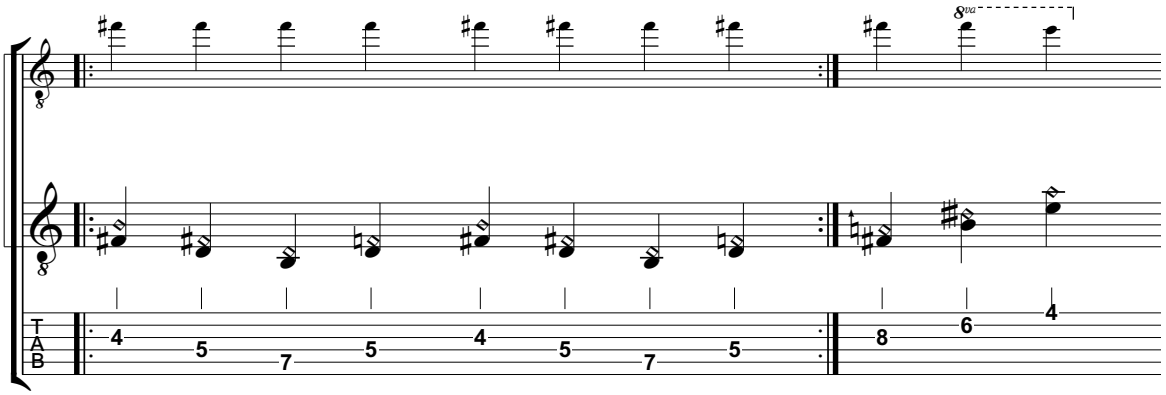


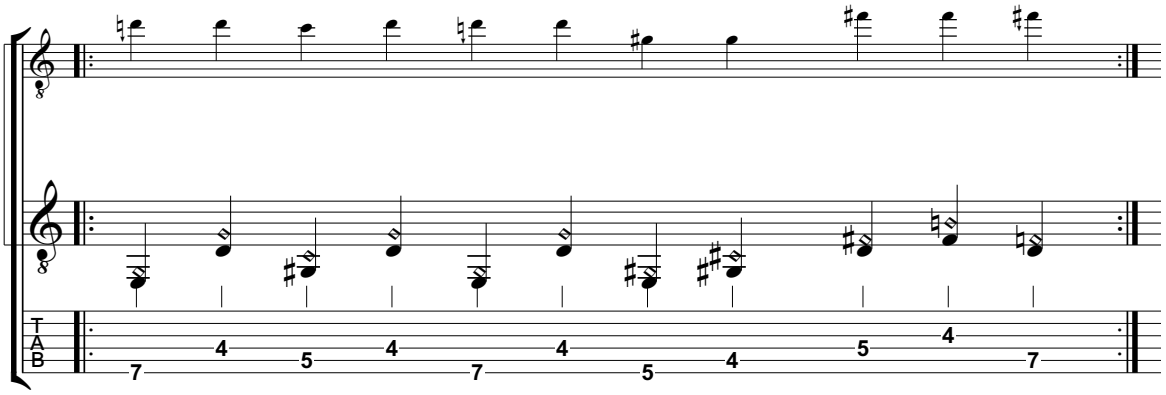

8va
8va
T
A
B
6 4 5 7 6 4 6 7
8va
T
A
B
6 4 5 7 7 4 7 4 7
8va
T
A
B
4 6 4 6 4 7
8va
T
A
B
4 7 4 7 4 6

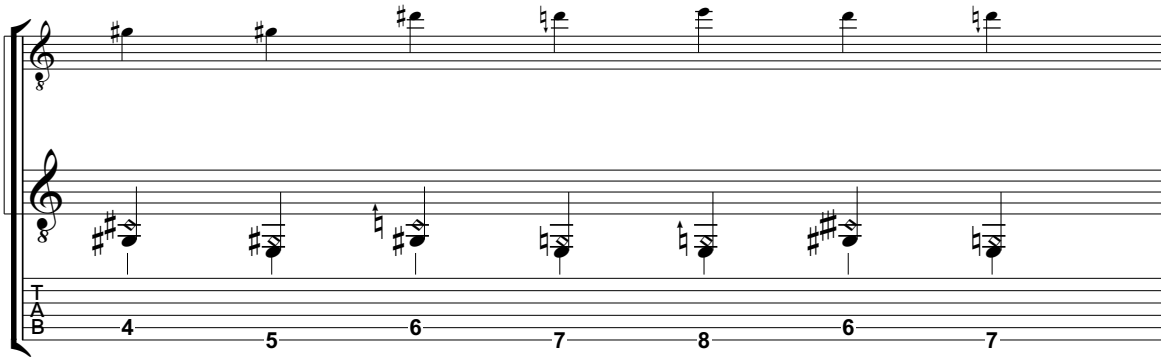
4




T
A
B
4 5 7 5 4 5 7 5

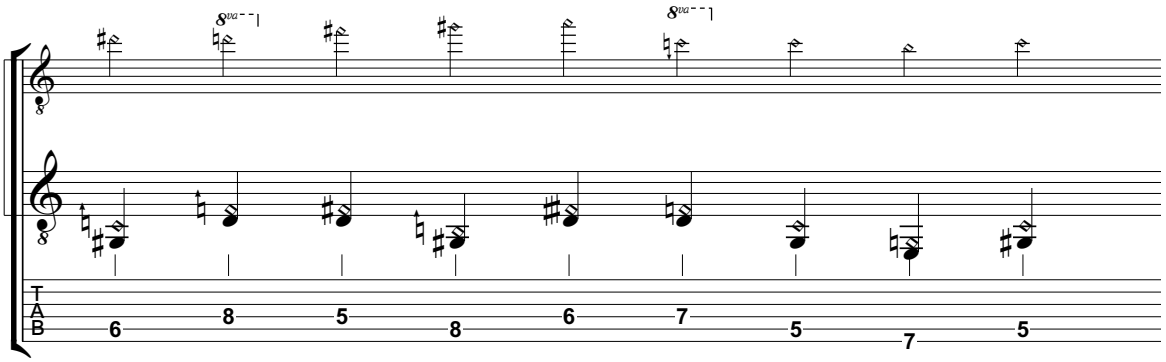

8va
T
A
B
4 5 7 5 4 5 7 5
8 6 4


T
A
B
7 4 5 4 7 4 5 4 5 4 7

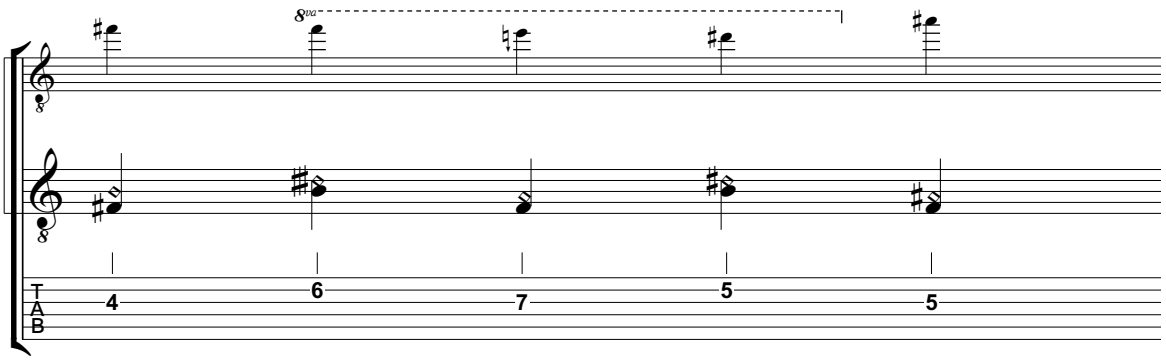


loop pedal BOSS RC30

LOOP PEDAL:
PRESS ON LEFT PEDAL
(RECORDS)

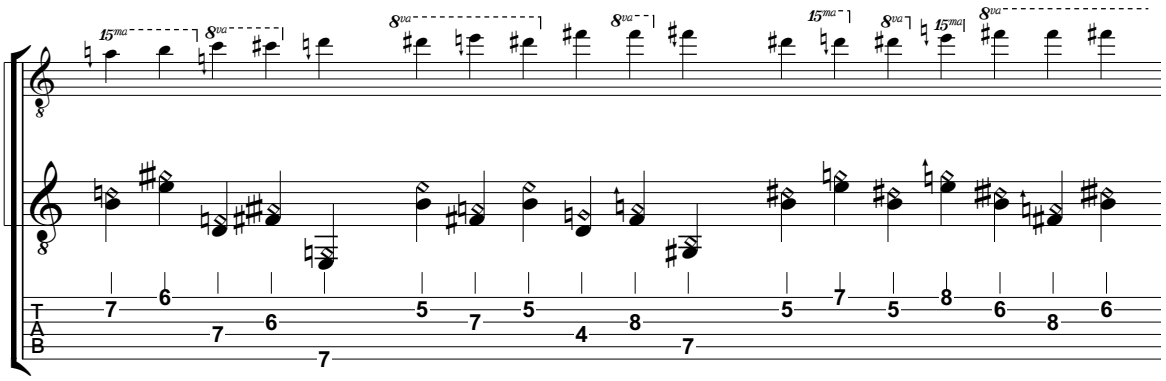


LOOP PEDAL:
PRESS ON LEFT PEDAL
(PLAYS AND RECORDS)

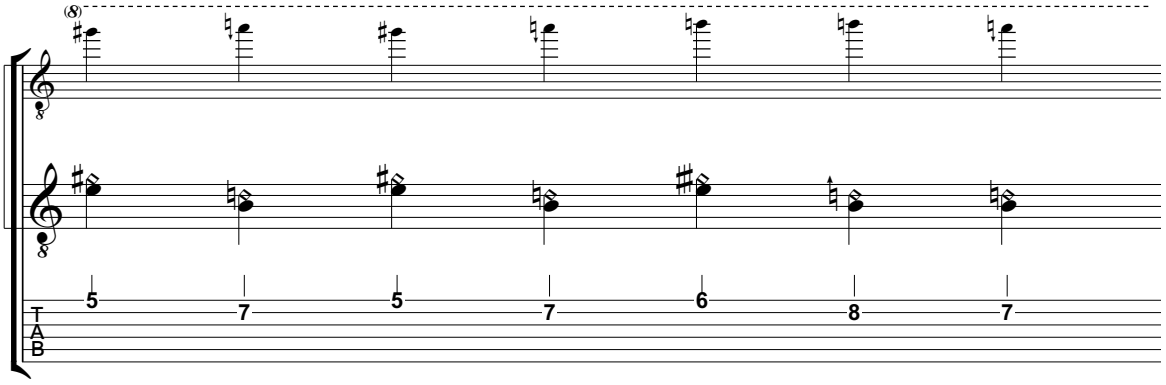


LOOP PEDAL:
PRESS ON LEFT PEDAL
(PLAYS AND RECORDS)

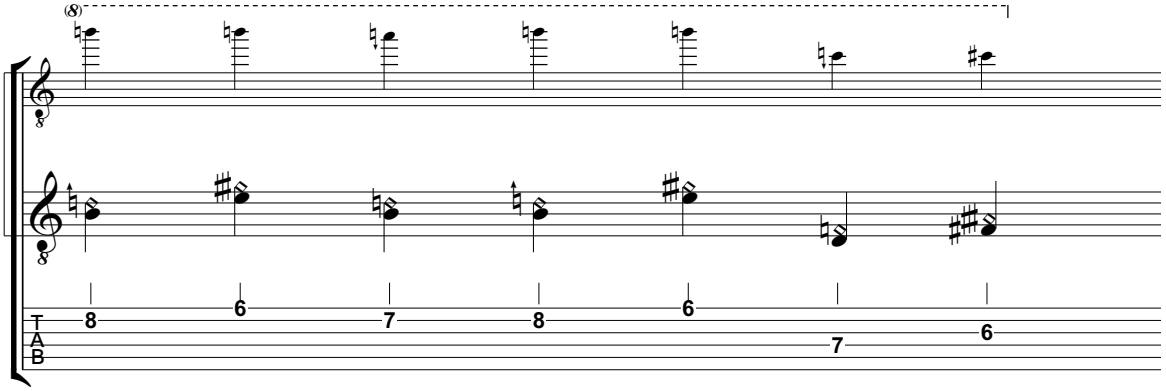
LOOP PEDAL:
PRESS ON LEFT PEDAL
(PLAYS AND RECORDS)



LOOP PEDAL:
PRESS ON LEFT PEDAL
(PLAYS AND RECORDS)

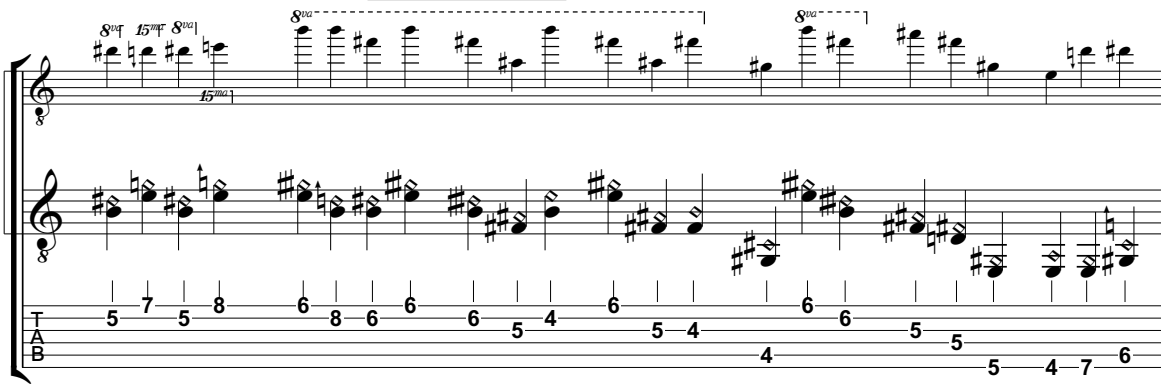


LOOP PEDAL:
PRESS ON LEFT PEDAL
(PLAYS AND RECORDS)

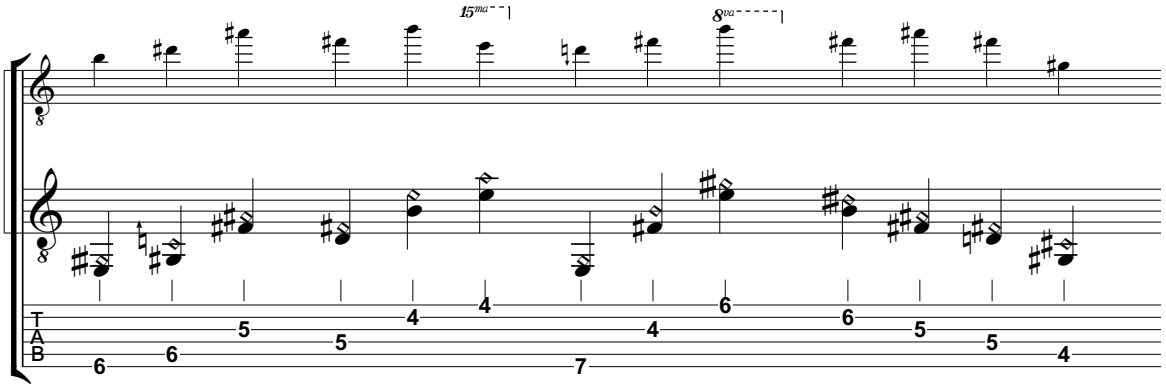


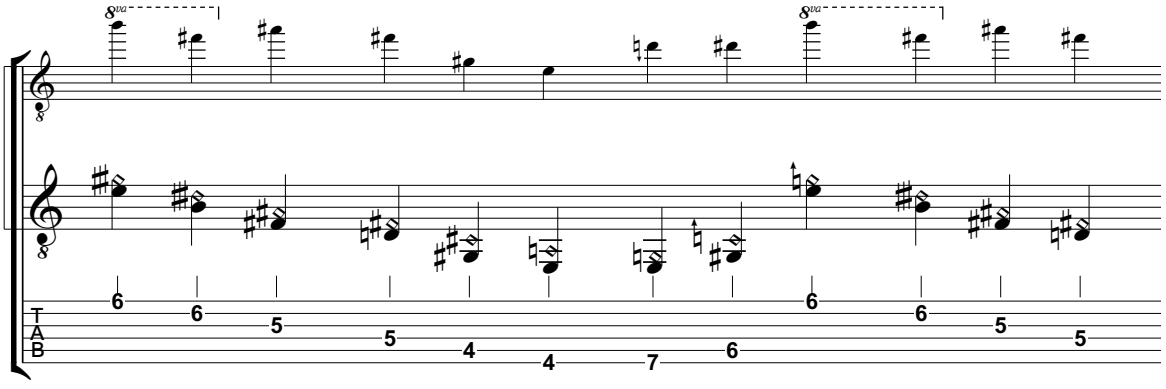
8

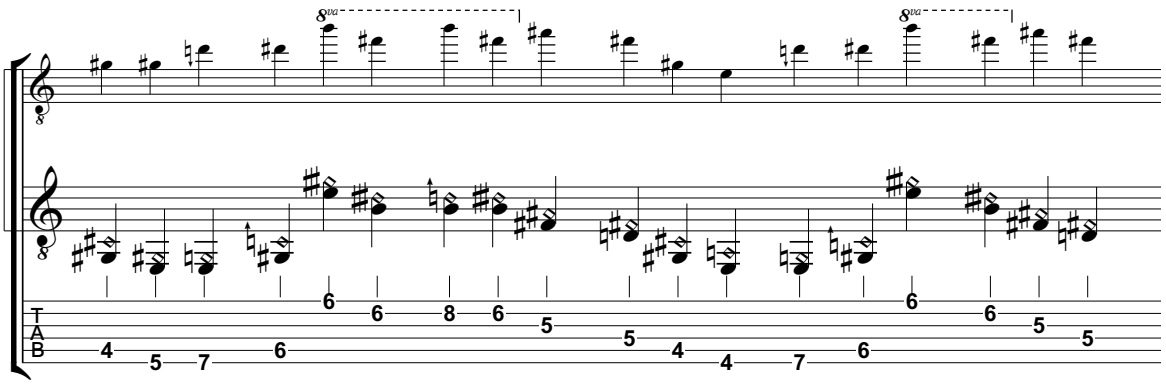
LOOP PEDAL:
PRESS ON LEFT PEDAL
(PLAYS AND RECORDS)

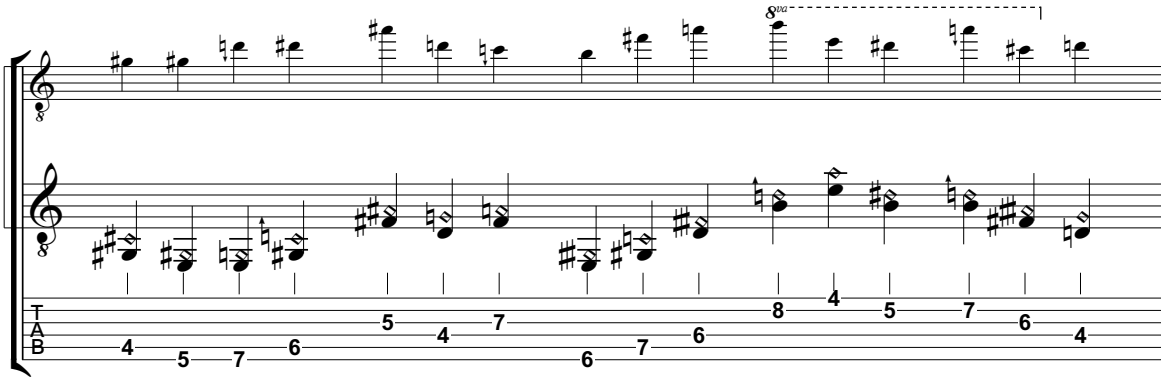


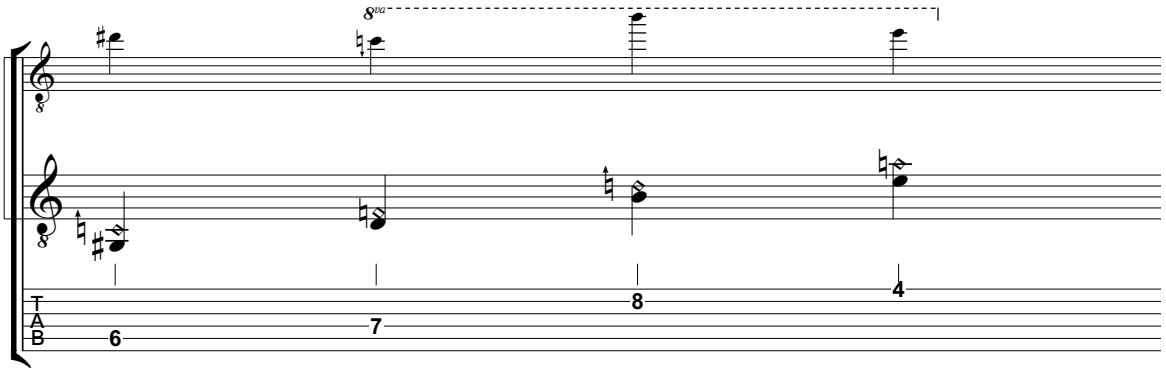
LOOP PEDAL:
PRESS ON RIGHT PEDAL
(STOPS LOOP PEDAL)

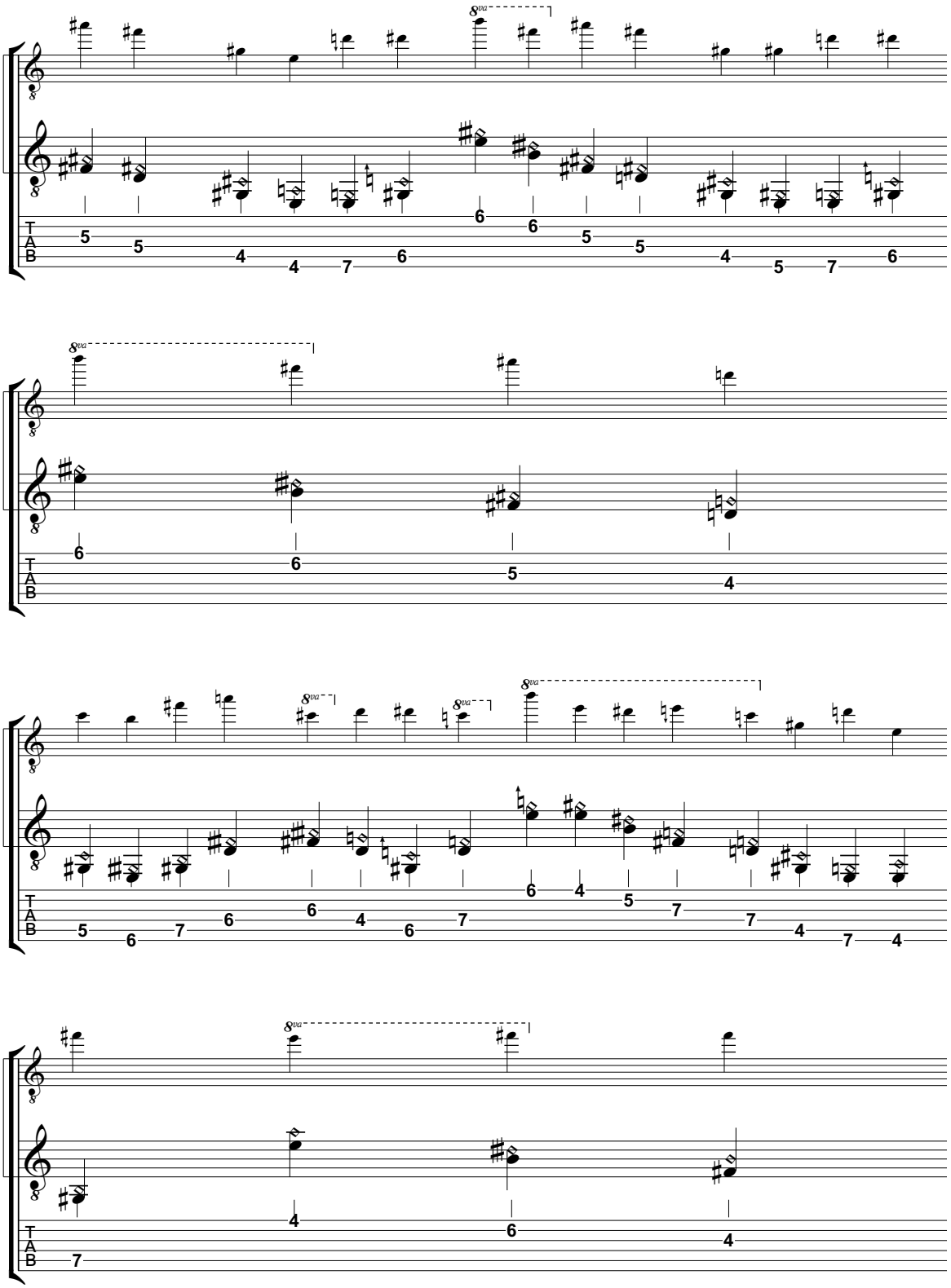


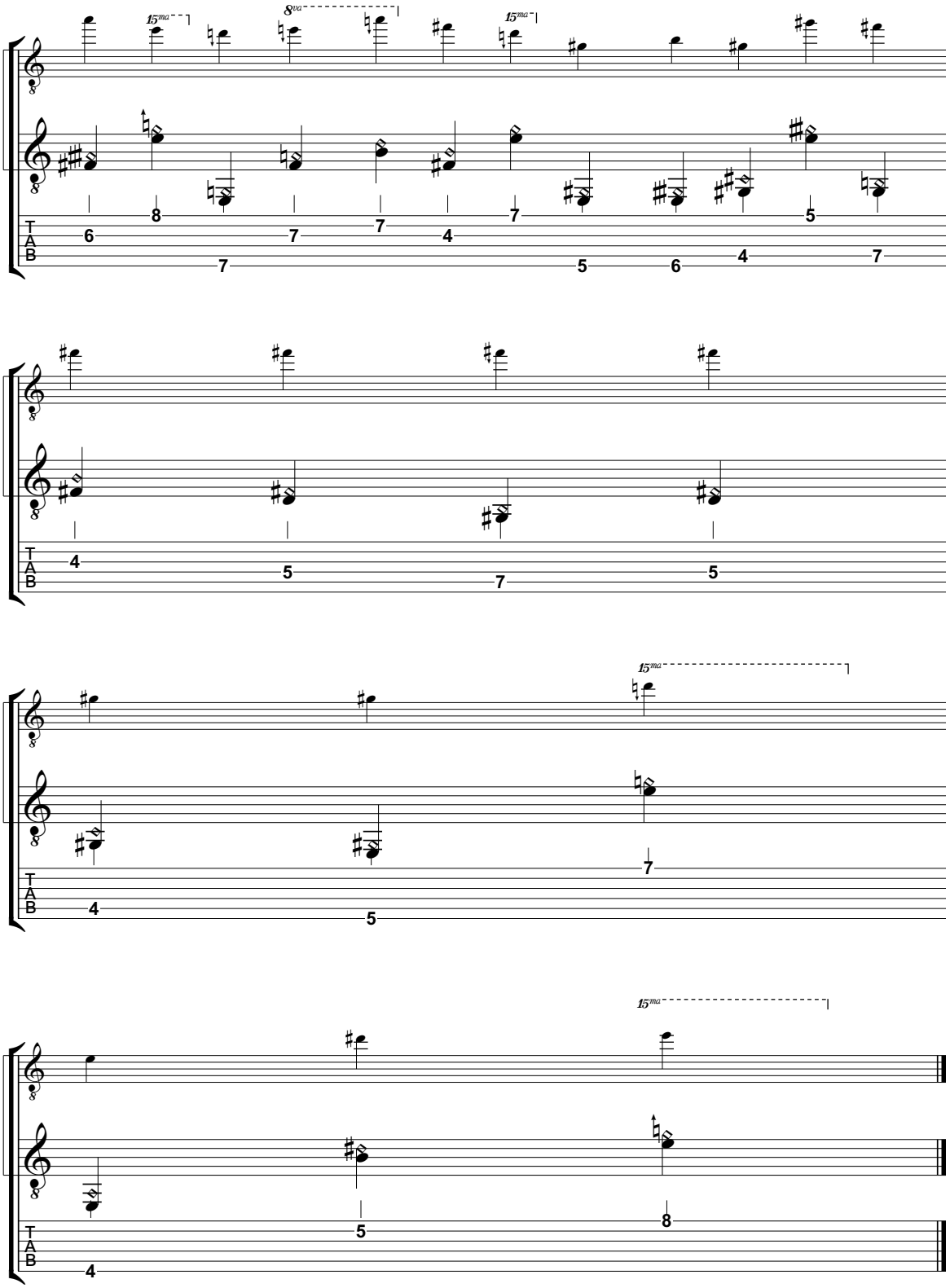



8va
8va
T
A
B
4 5 7 6 6 6 8 6 5 5 4 4 7 6 6 6 5 5


8va
T
A
B
4 5 7 6 5 4 7 6 7 6 8 4 5 7 6 4


8va
T
A
B
6 7 8 4




15ma
8va
15ma
T
A
B
6 8 7 7 4 7 5 6 4 7
4 5 7 5
4 5 7
15ma
4 5 8
15ma

C.6

3 Poems by Andrew Choate (2017)

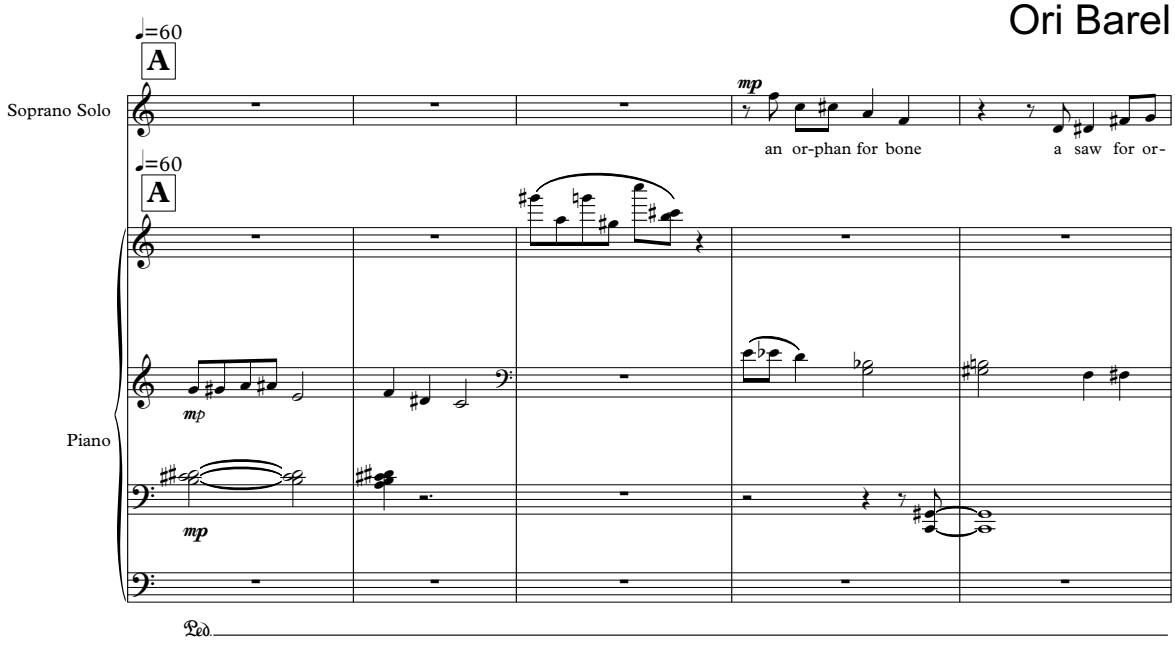
For Soprano, Player Piano and Fixed Media

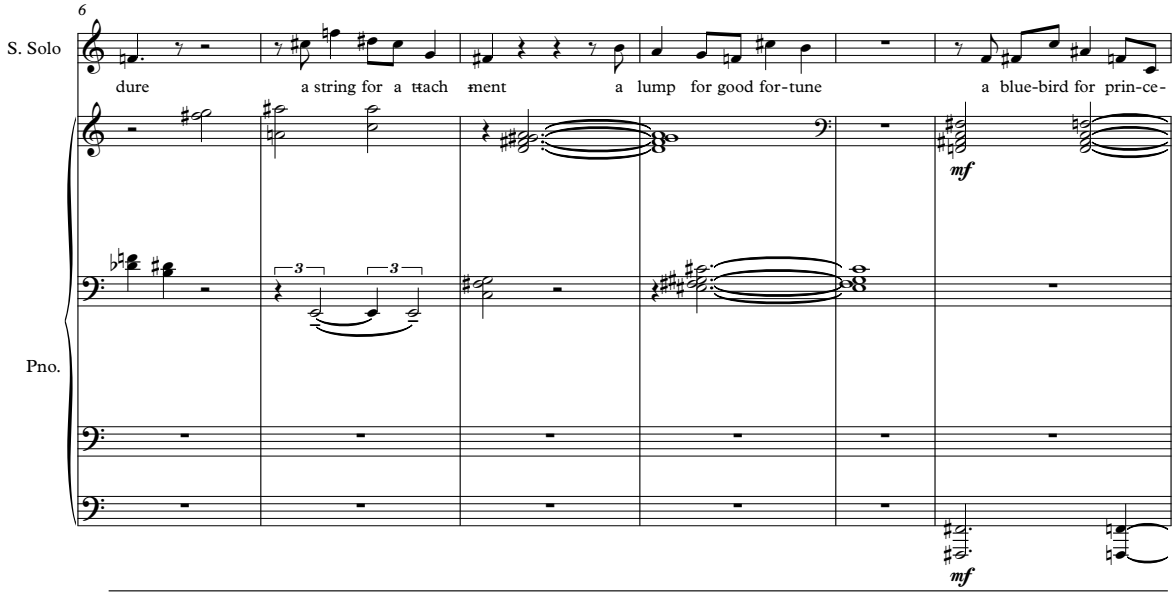
Ori Barel

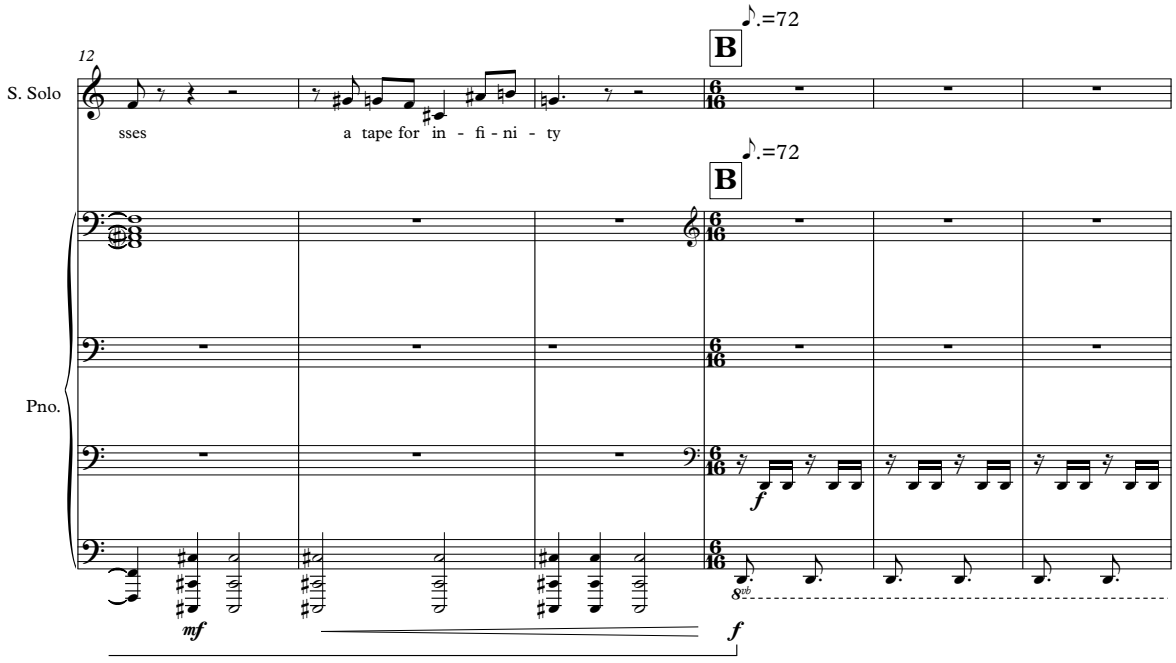
Three Poems by Andrew Choate
for Soprano, Player Piano and Fixed Media

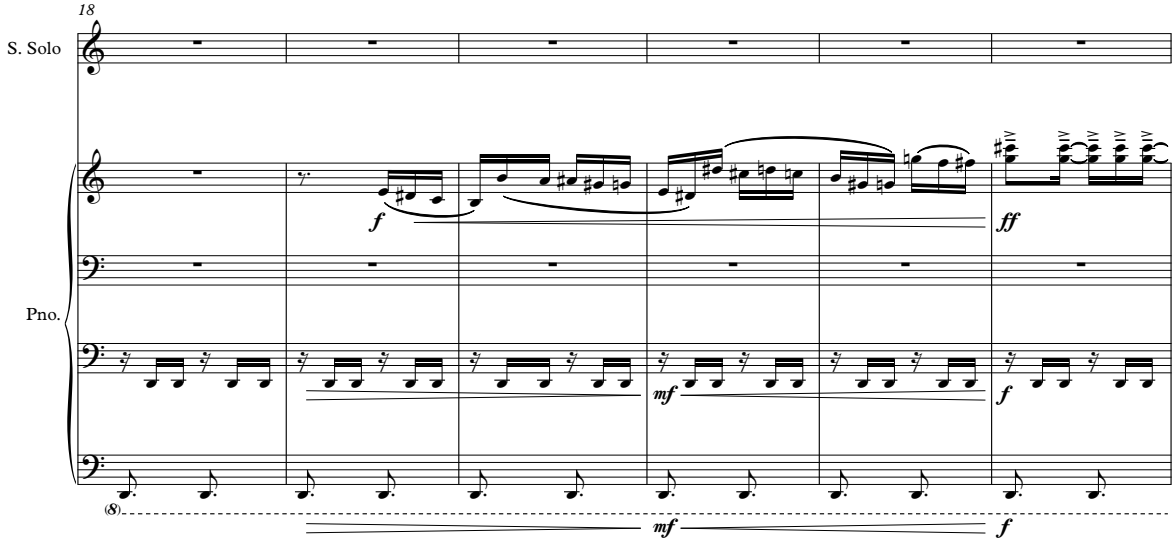
Three Poems by Andrew Choate
for Kyra Folk-Farber
I. A Dime In The Pond

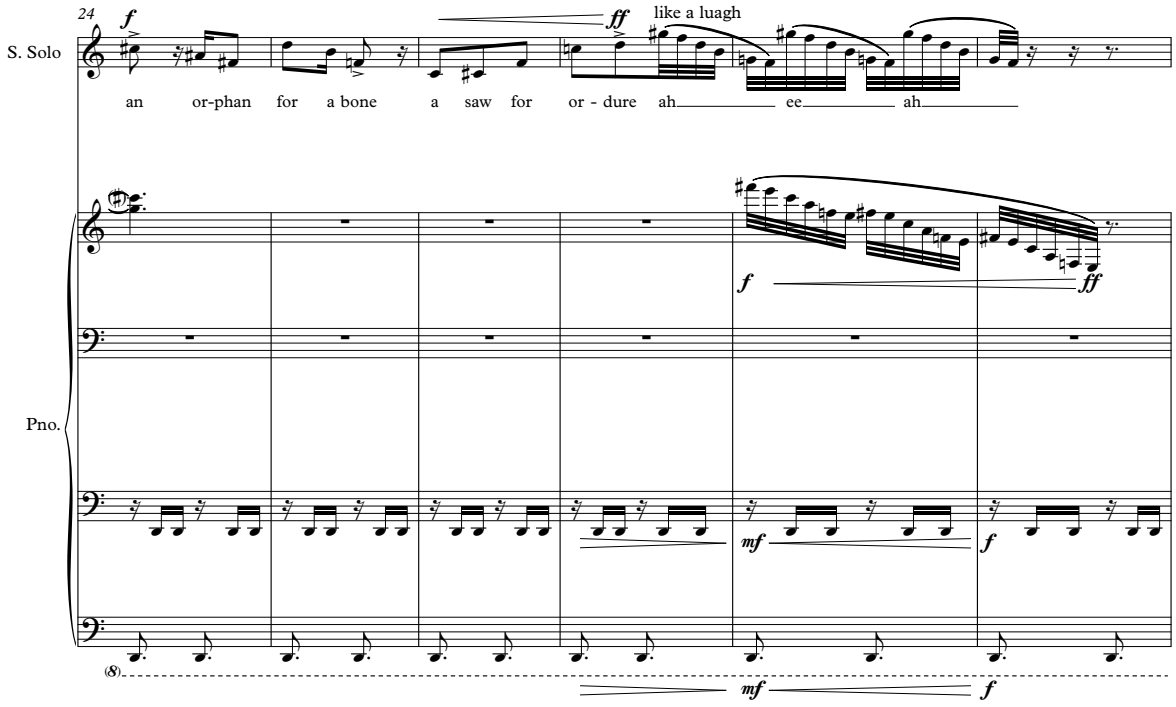
Ori Barel

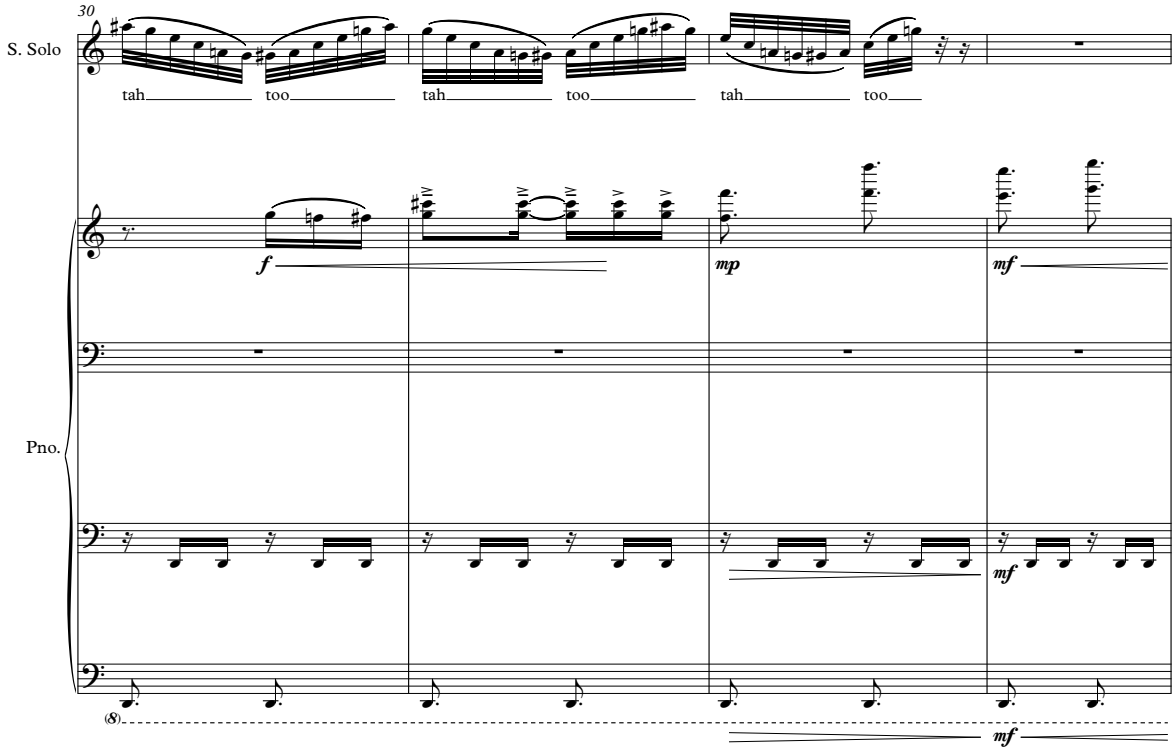


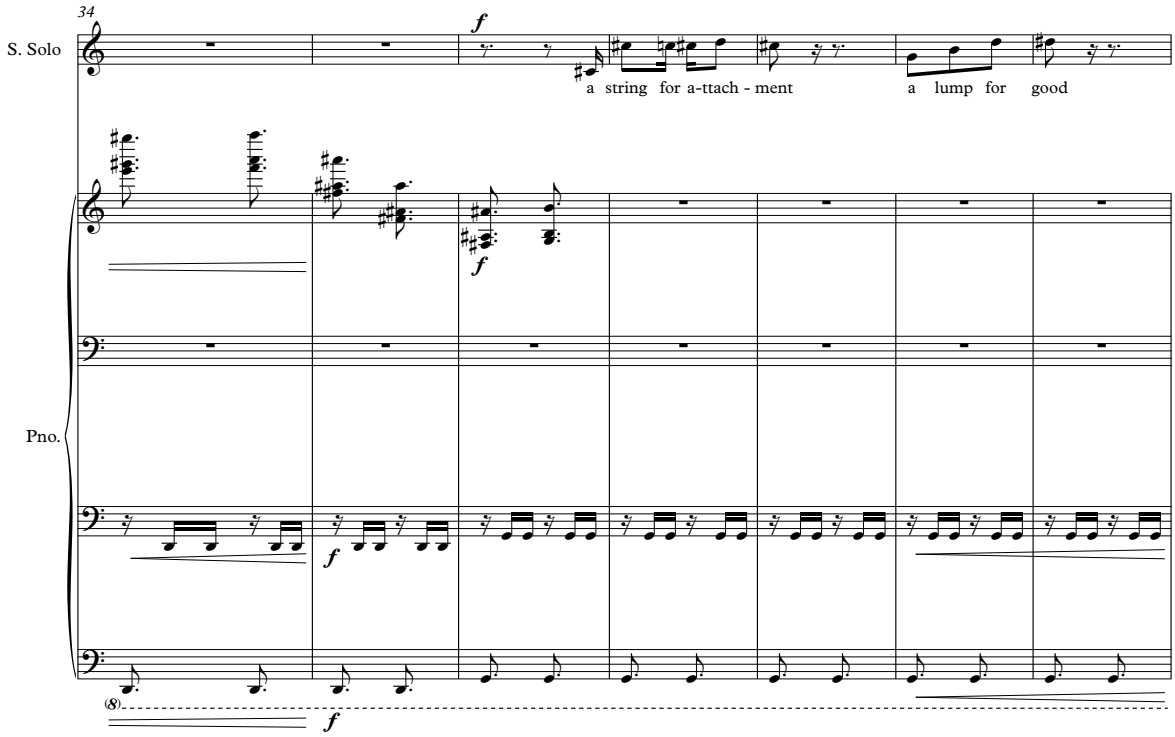


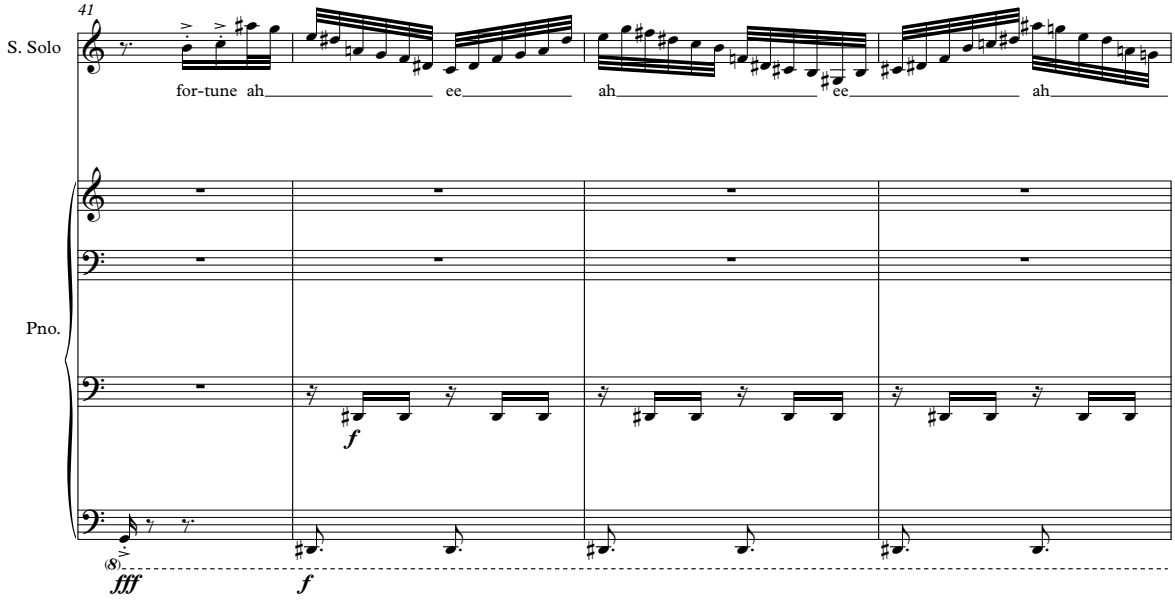

12
S. Solo
Pno.
sses
a tape for in - fi - ni - ty
B
♪.=72
B
♪.=72
mf
f
8vb
f

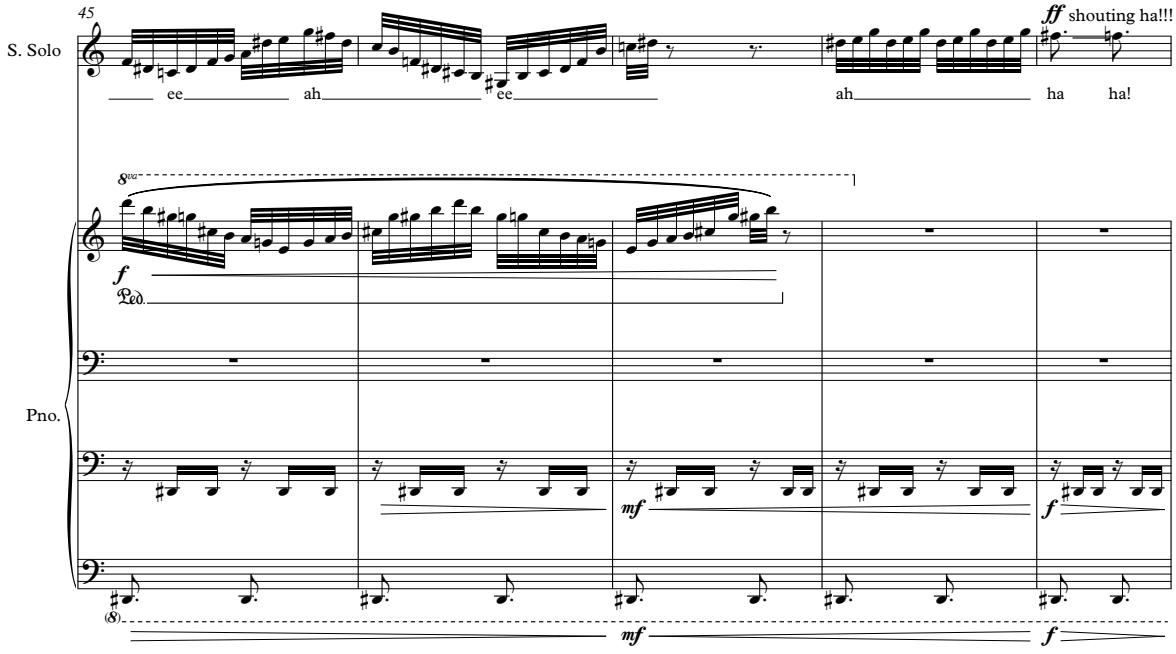

18
S. Solo
Pno.
f
ff
mf
f
(8)
mf
f

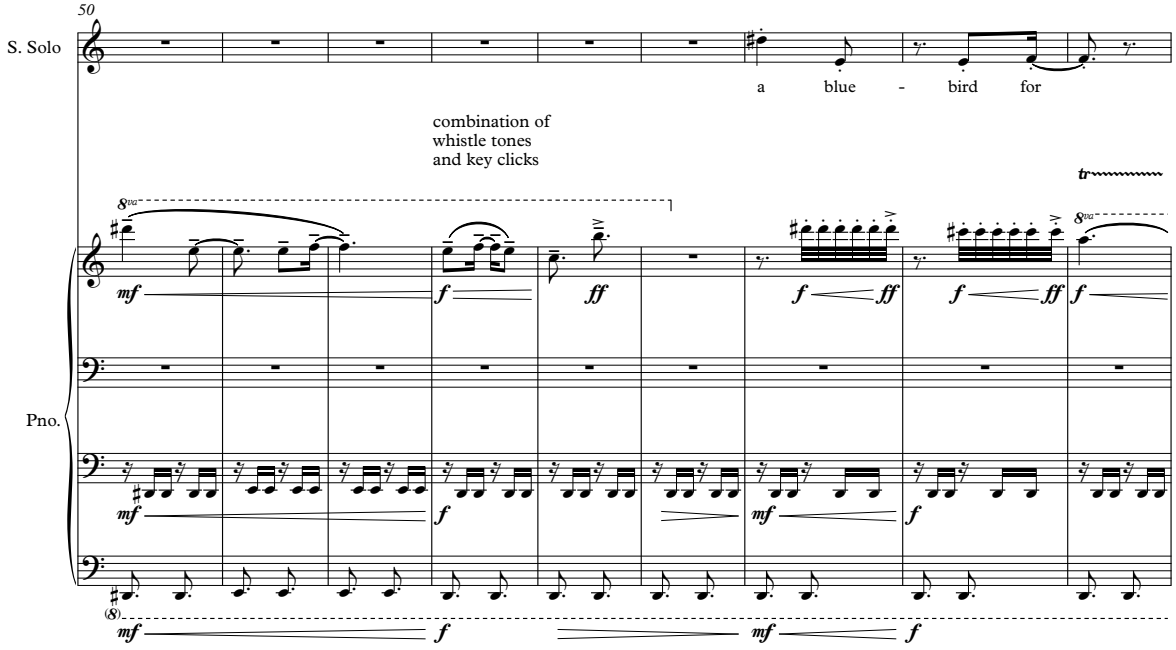

24
S. Solo
Pno.
like a luagh
an or-phan for a bone a saw for or - dure ah ee ah

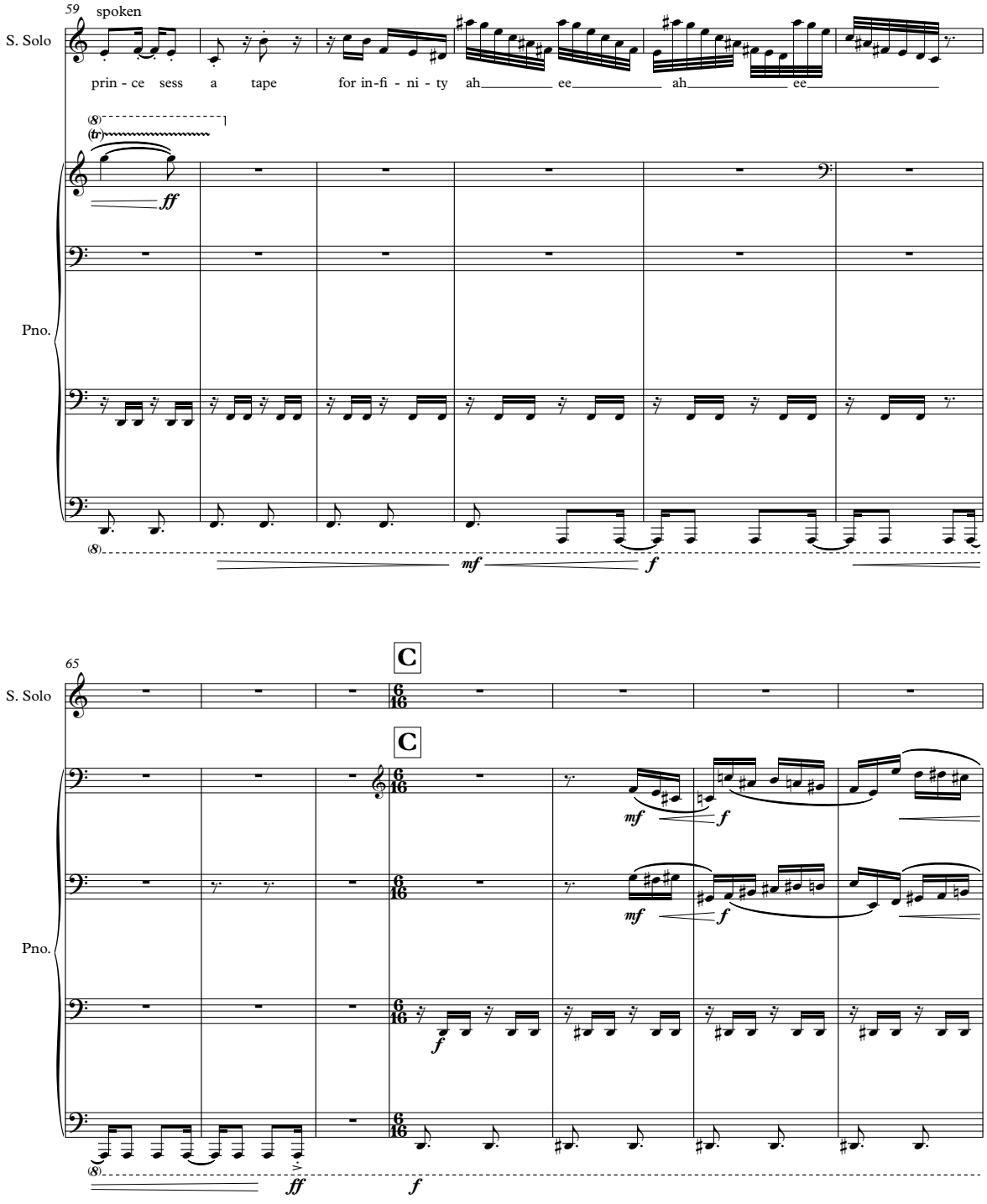

30
S. Solo
Pno.
tah too tah too tah too

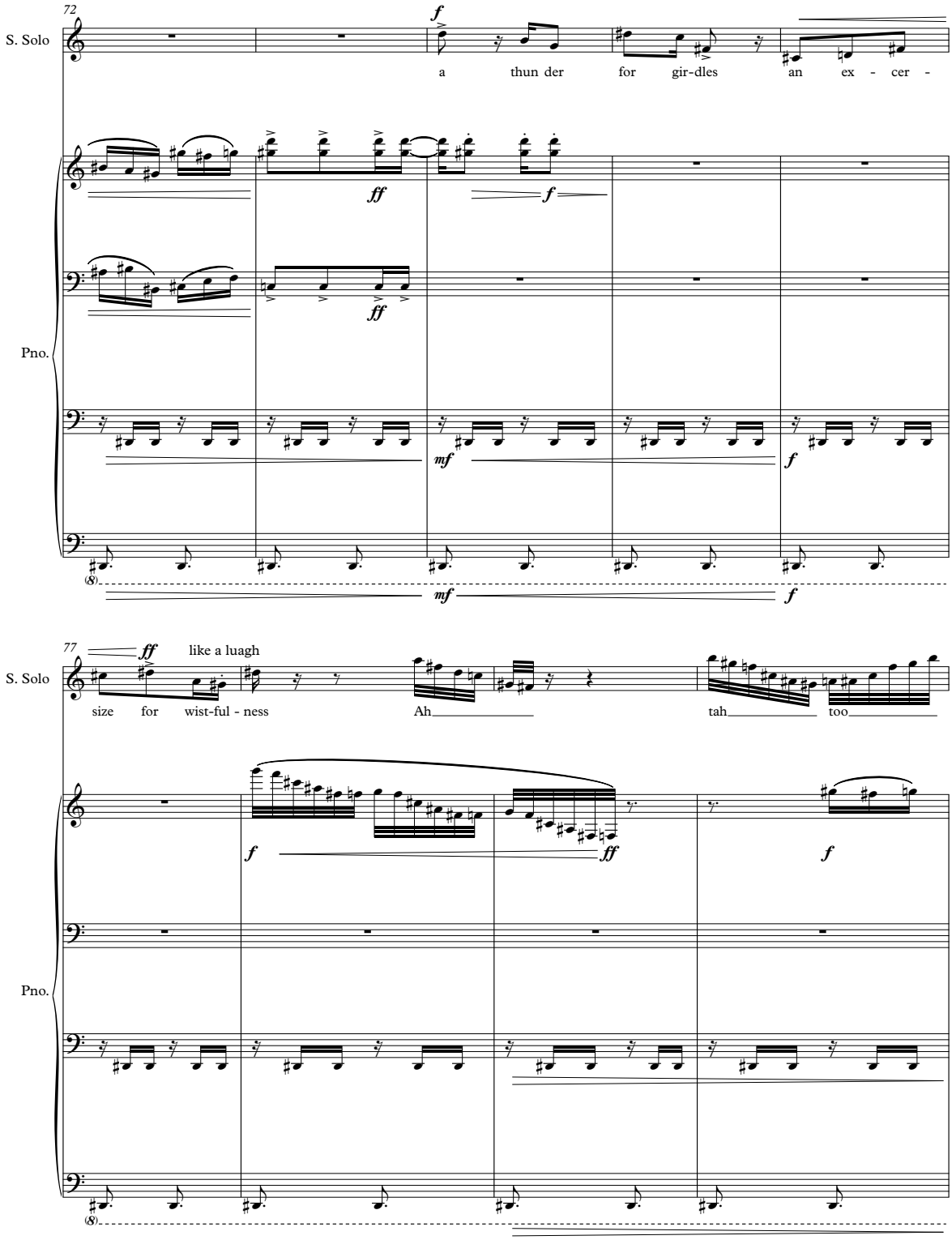

34
S. Solo
a string for a-ttach - ment
a lump for good
Pno.
(8)

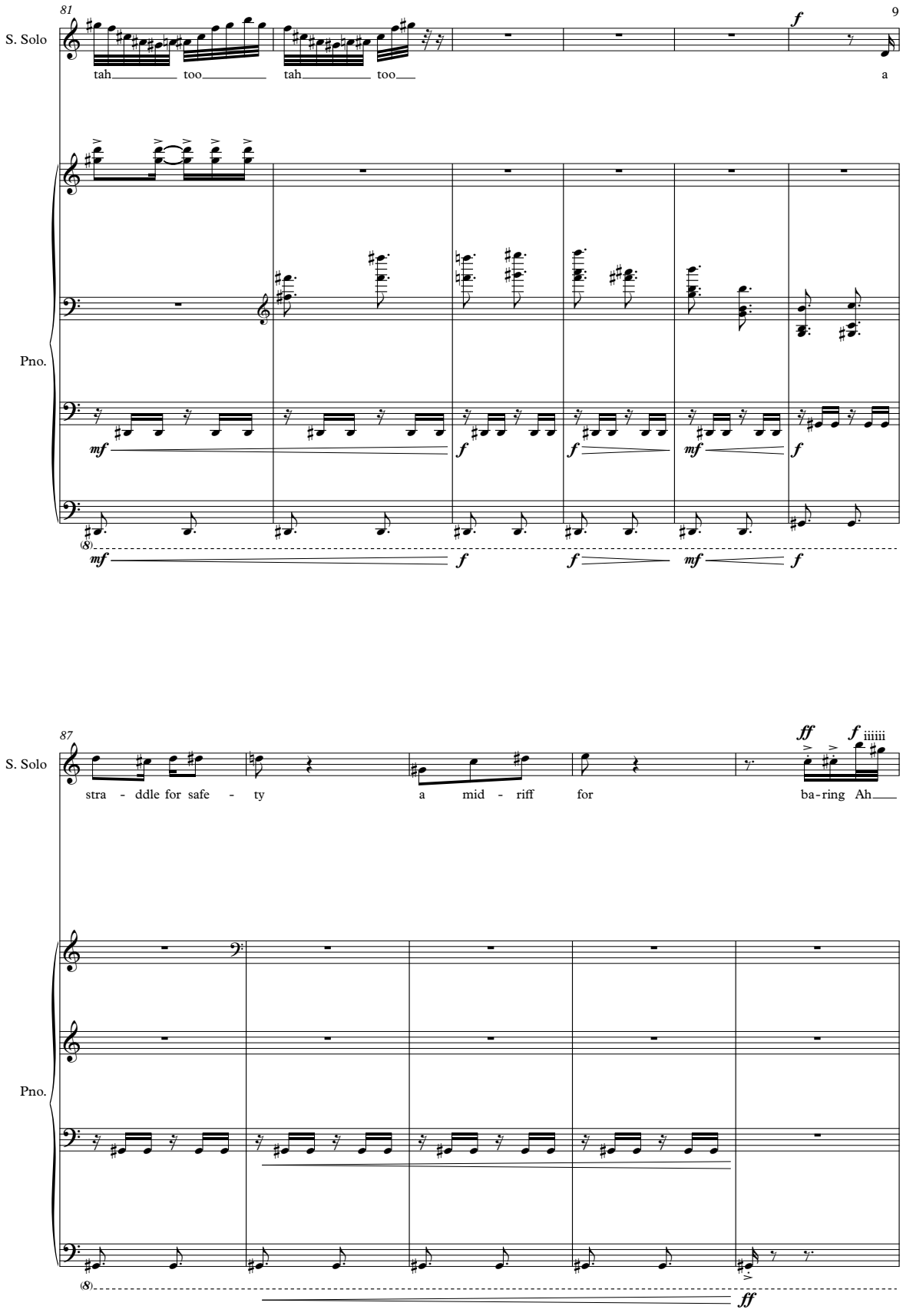

41
S. Solo
for-tune ah ee ah ee ah
Pno.
(8)

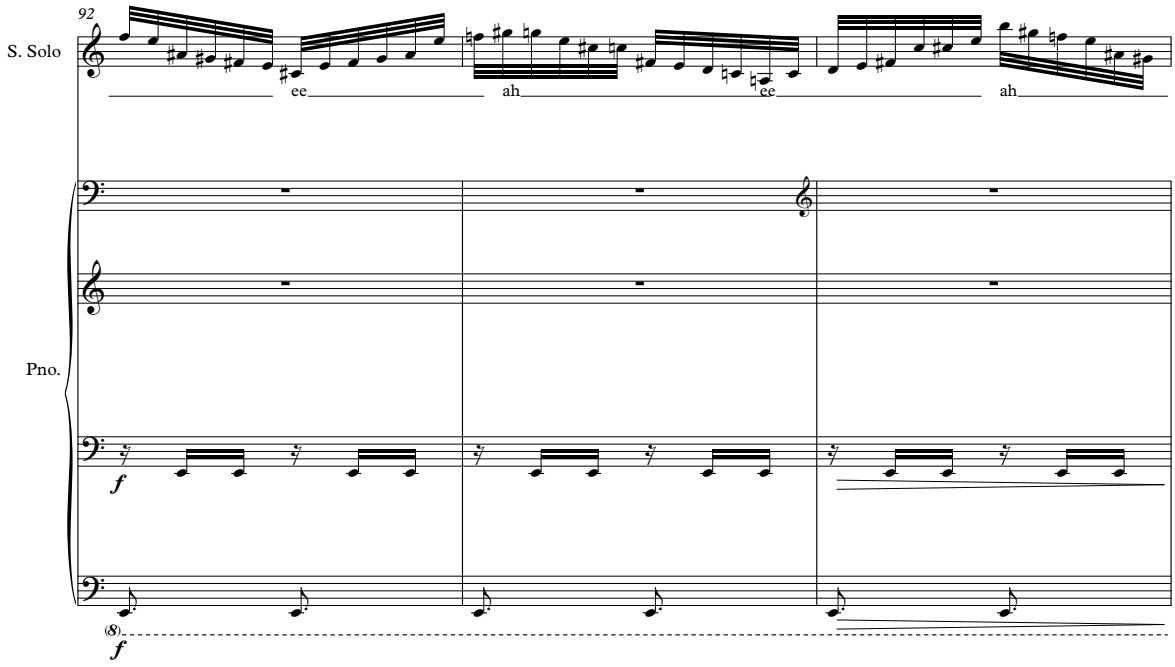

45
S. Solo
ff shouting ha!!!
ee ah ee ah ha ha!
8va
f
Ped.
Pno.
mf
f
(8)
mf
f

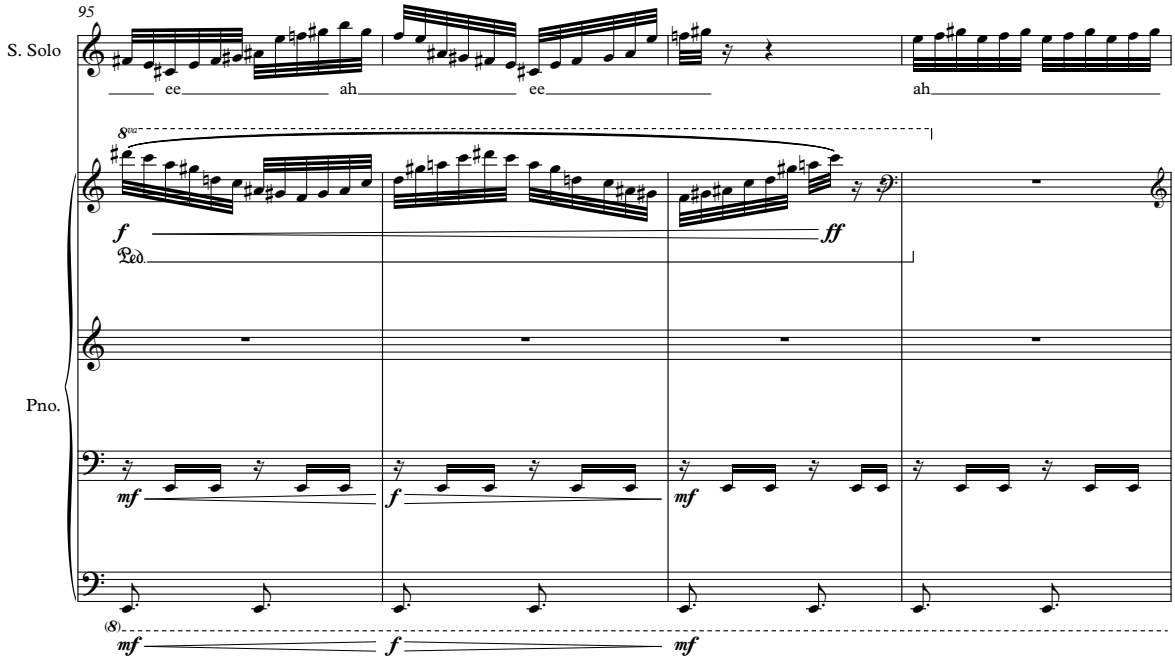

50
S. Solo
a blue - bird for
combination of
whistle tones
and key clicks
tr
8va
mf
f
ff
f
ff
f
ff
f
8va
Pno.
mf
f
mf
f
(8)
mf
f
mf
f

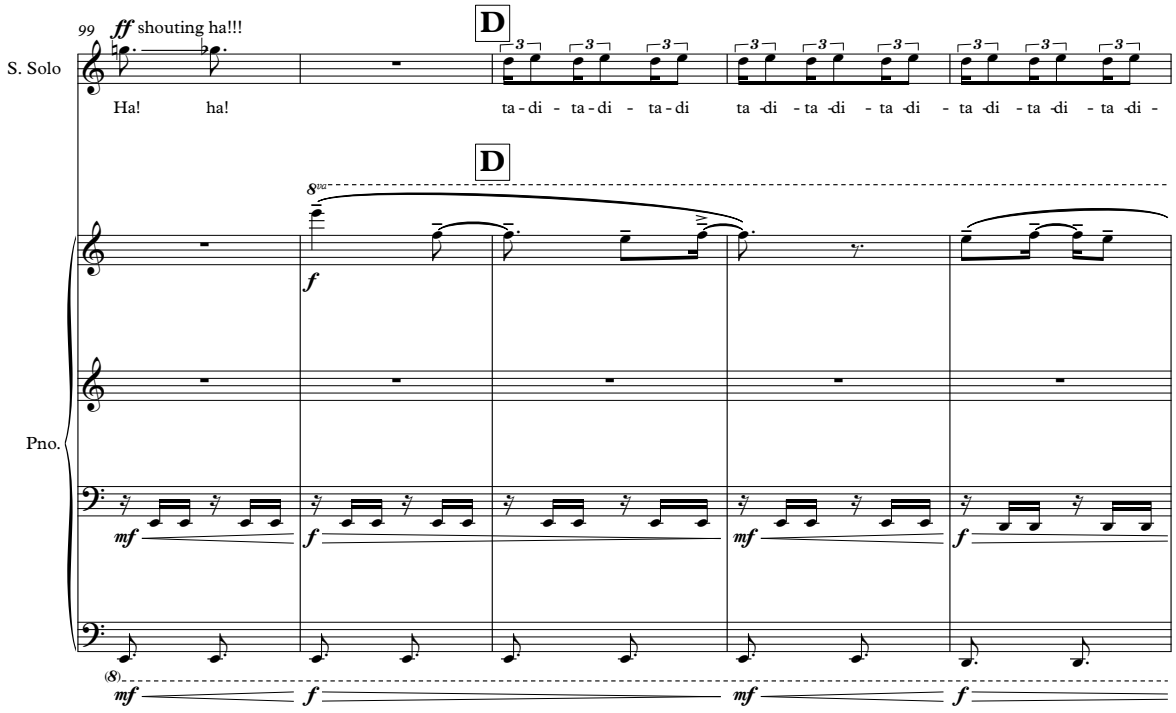

59
spoken
S. Solo
prin - ce sess a tape for in-fi - ni - ty ah ee ah ee
(8)
(tr)
ff
Pno.
(8)
mf
f
65
C
C
S. Solo
Pno.
mf
f
mf
f
f
(8)
ff
f

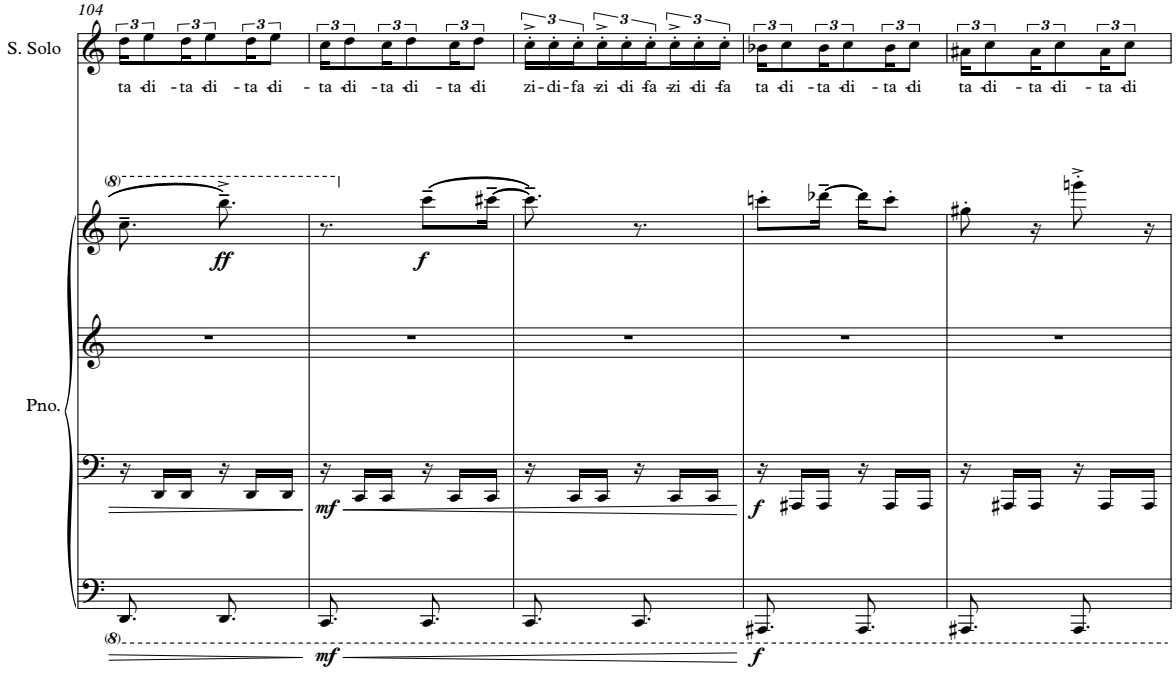

72
S. Solo
Pno.
a thun der for gir-dles an ex - cer -
like a luagh
size for wist-ful - ness
Ah
tah
too

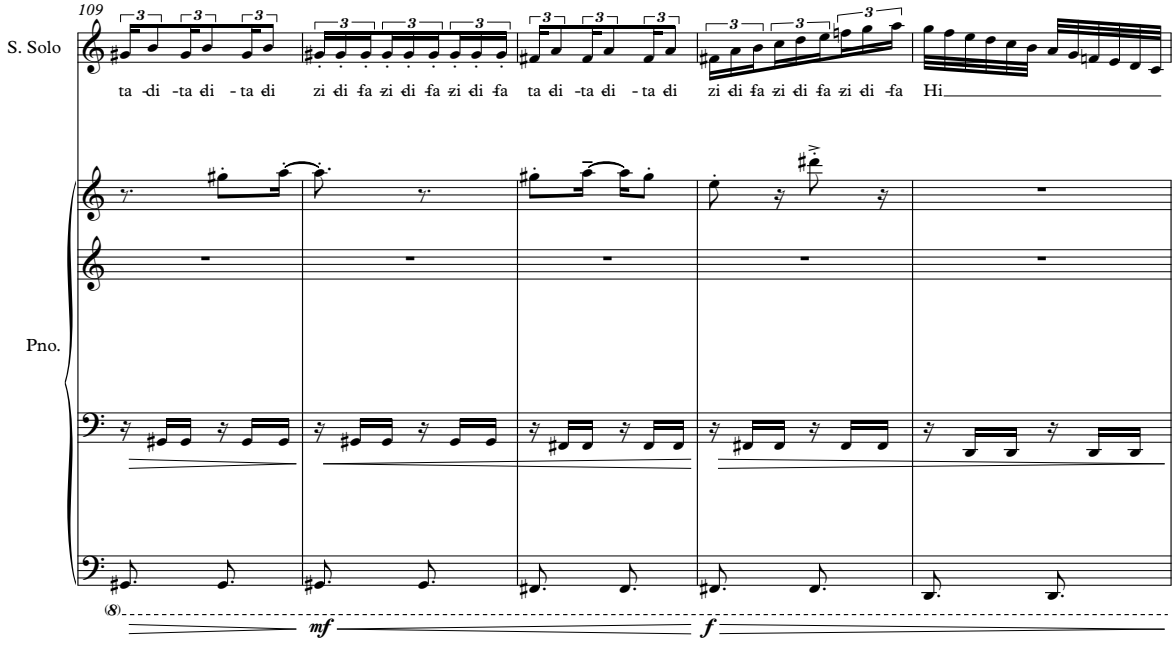

81
9
S. Solo
tah too tah too
a
Pno.
mf
f
87
S. Solo
stra - ddle for safe - ty
a mid - riff for
ba-ring Ah
iiiiii
Pno.
ff

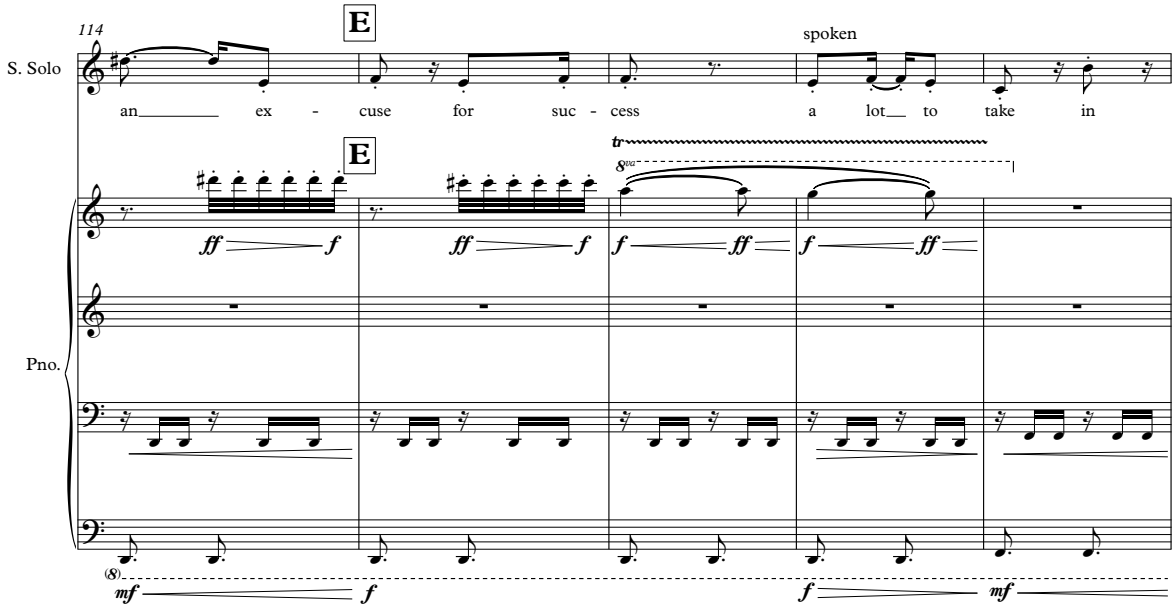

92
S. Solo
ee
ah
ee
ah
Pno.
f
(8)
f

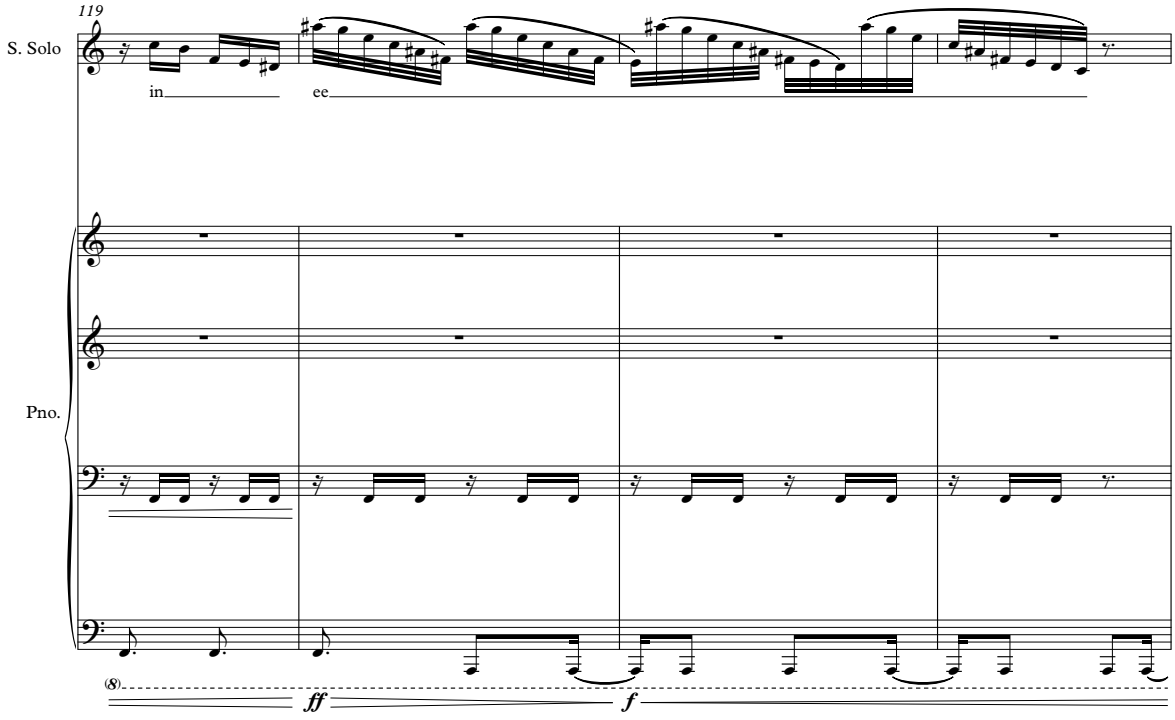

95
S. Solo
ee
ah
ee
ah
8va
f
ff
Ped.
Pno.
mf
f
mf
(8)
mf
f
mf

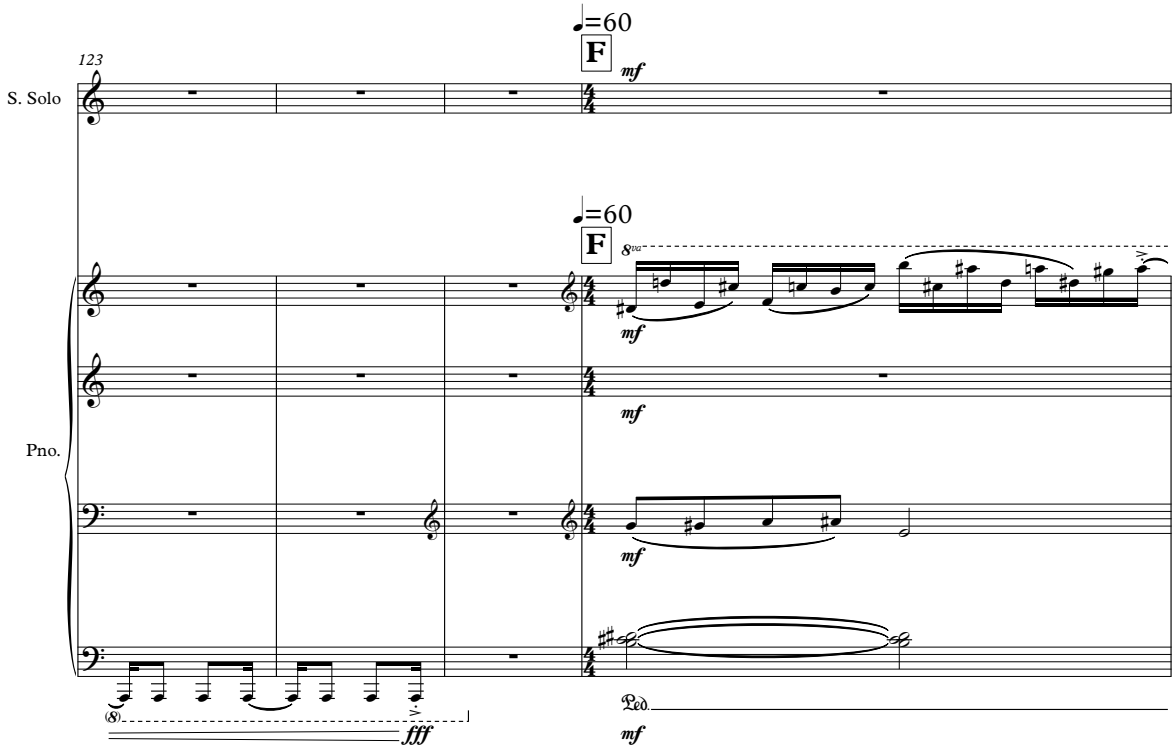

99
ff shouting ha!!!
D
S. Solo
Ha! ha!
ta - di - ta - di - ta - di ta - di - ta - di - ta - di - ta - di - ta - di -
D
8va
f
Pno.
mf
f
mf
f
(8)
mf
f
mf
f

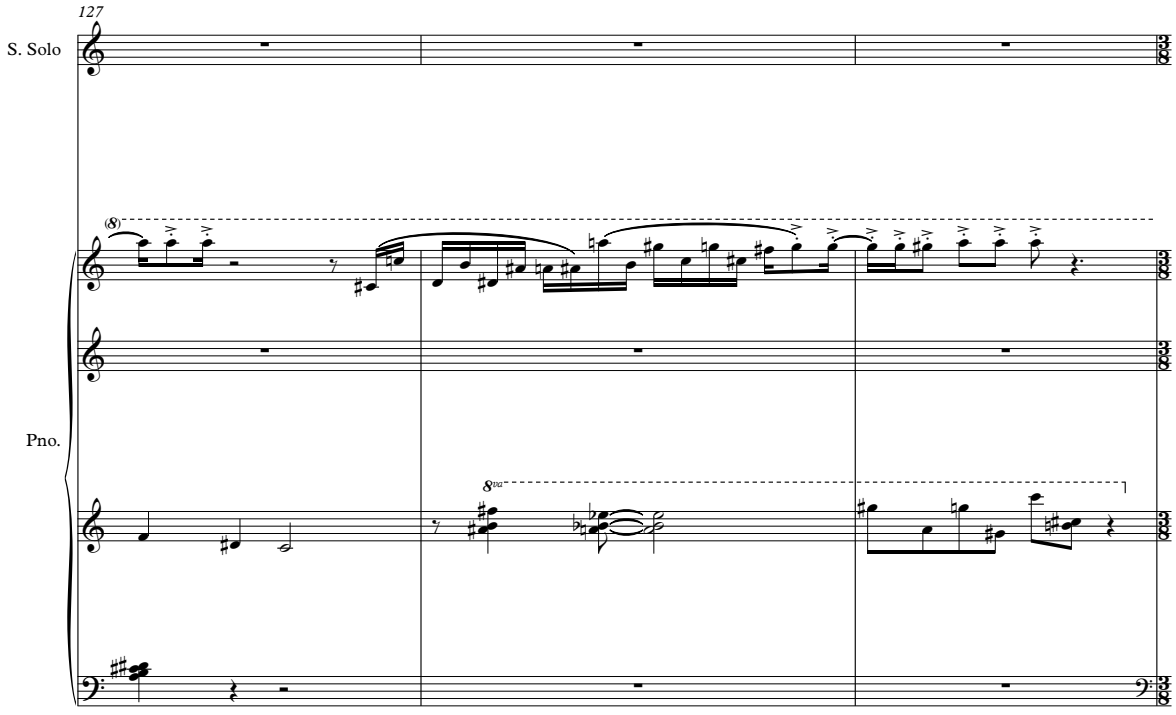

104
S. Solo
ta - di - ta - di - ta - di - ta - di - ta - di - ta - di zi - di - fa - zi - di - fa - zi - di - fa ta - di - ta - di - ta - di ta - di - ta - di - ta - di
(8)
ff
f
Pno.
mf
f
(8)
mf
f

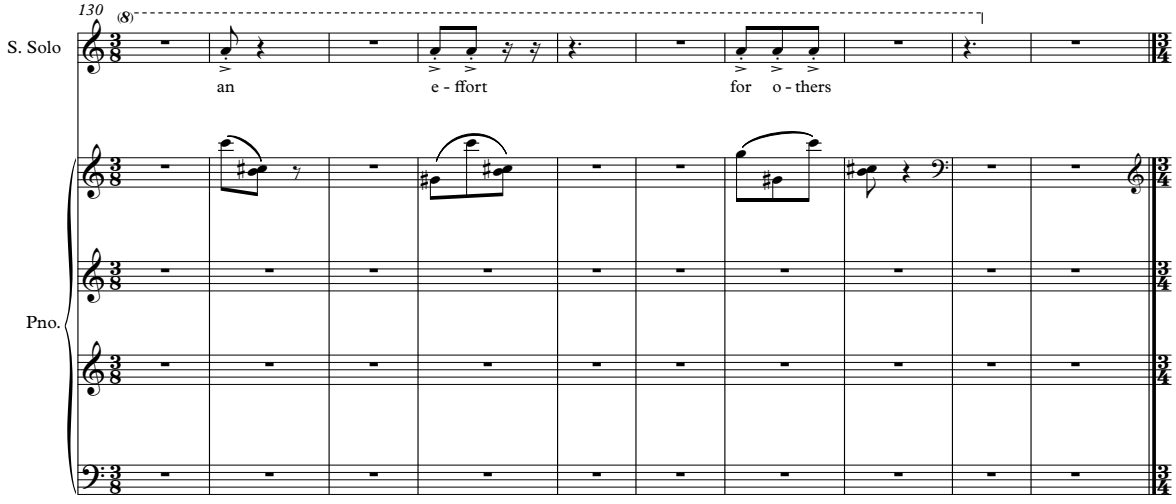

109
S. Solo
ta -di -ta di - ta di
zi di fa zi di fa zi di fa
ta di -ta di - ta di
zi di fa zi di fa zi di -fa
Hi
Pno.
(8)
mf
f

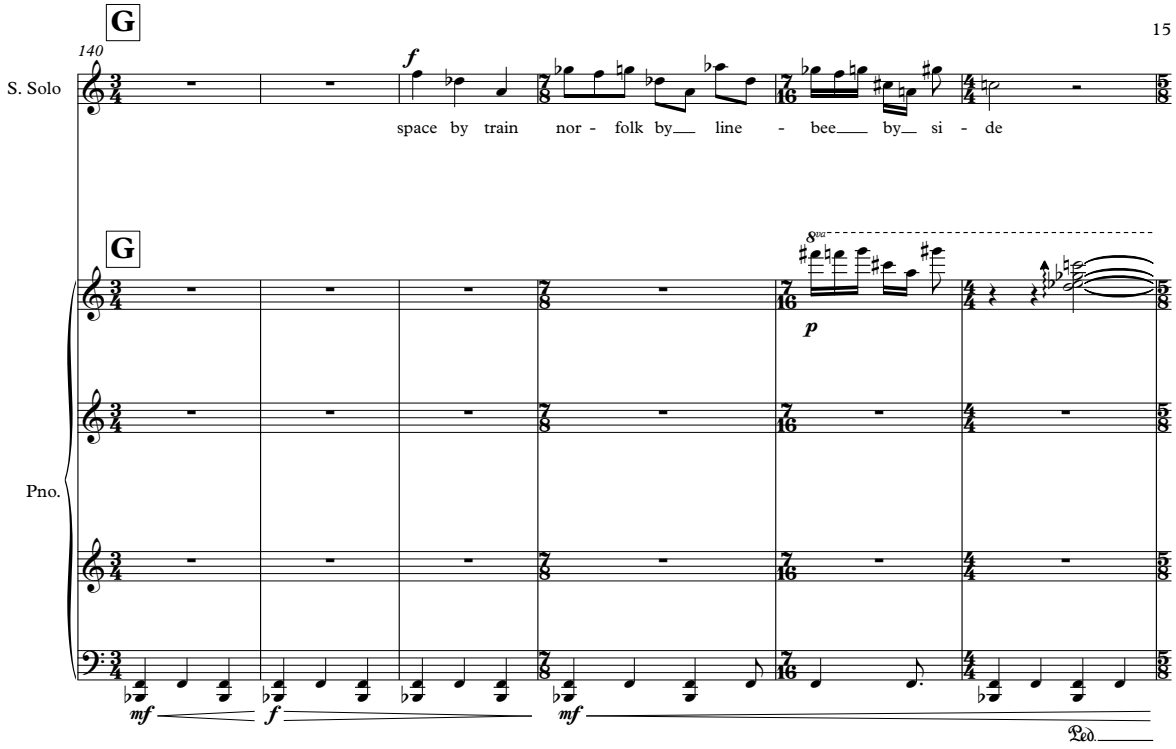

114
E
spoken
S. Solo
an ex - cuse for suc - cess
a lot to take in
E
tr
8va
ff
f
Pno.
(8)
mf
f
f
mf

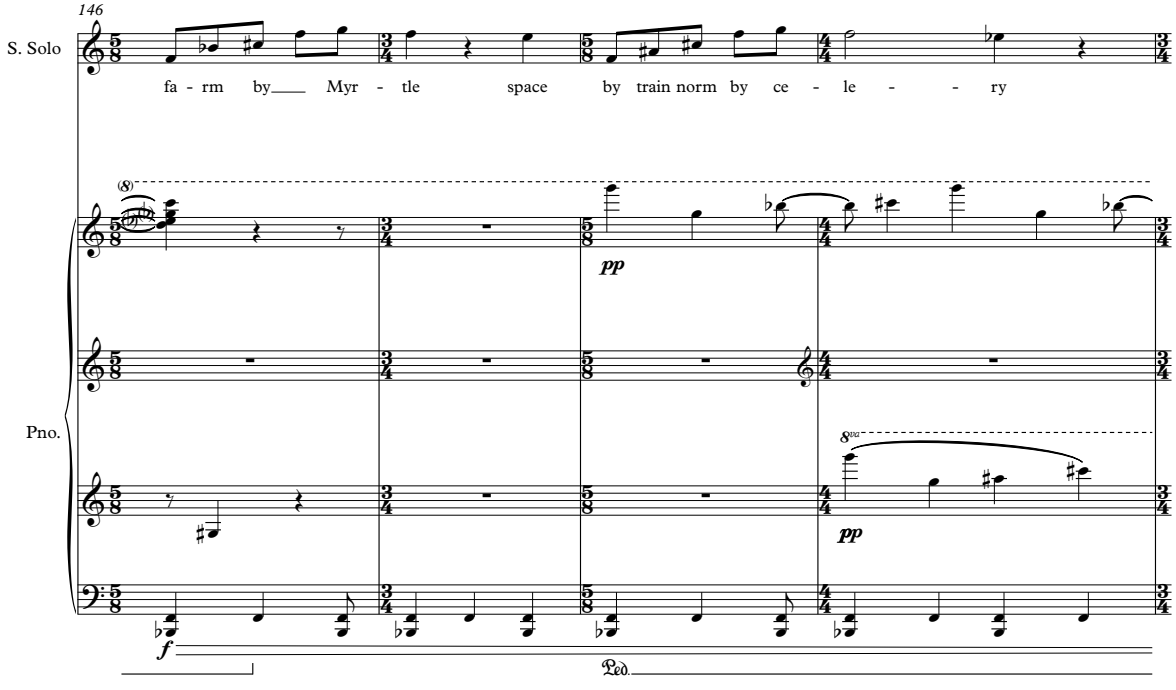

119
S. Solo
in
ee
Pno.
ff
f


123
S. Solo
♩=60
F
mf
8va
Pno.
fff
Ped.

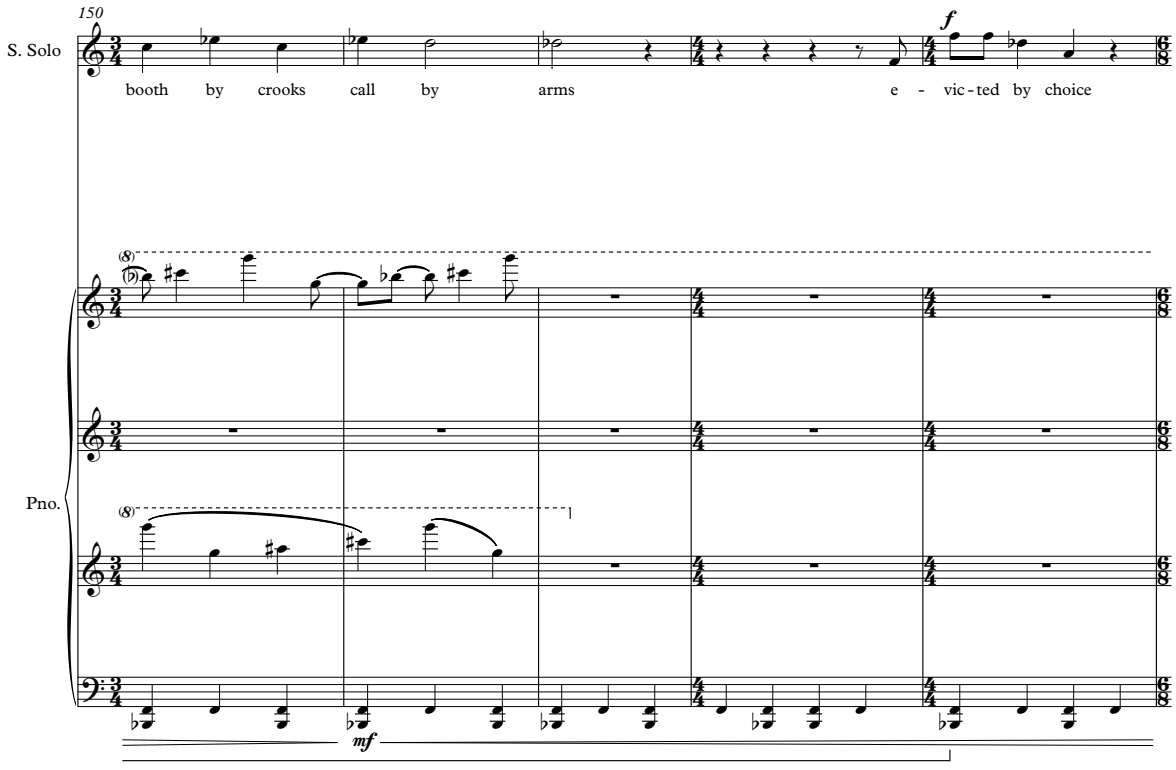

127
S. Solo
Pno.

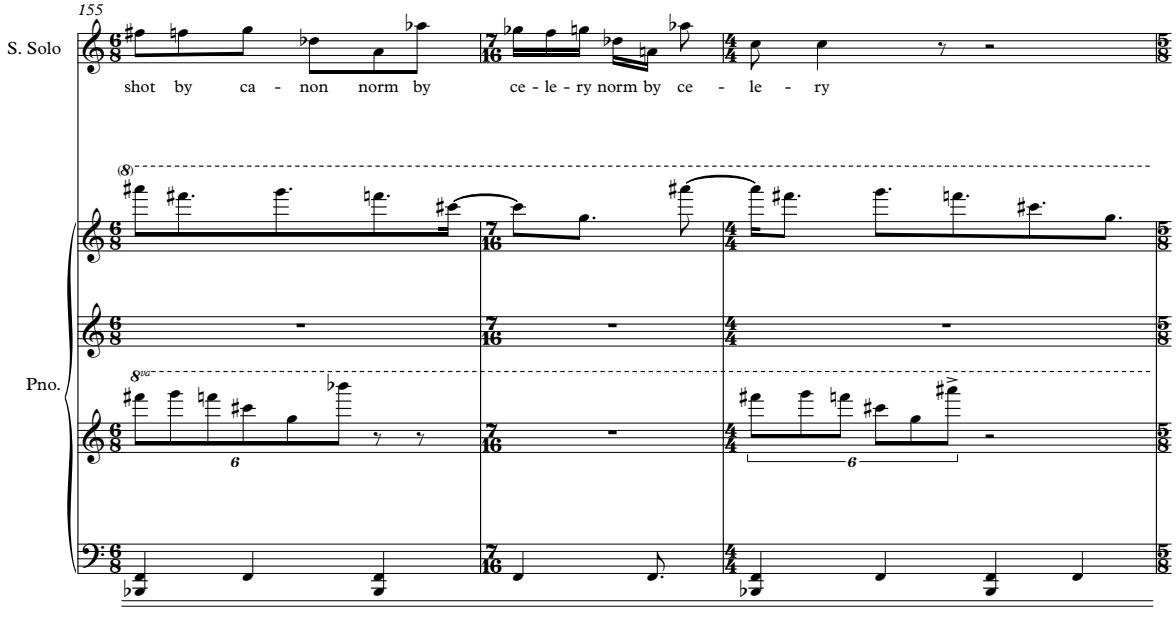

130
S. Solo
an
e - ffort
for o - thers
Pno.

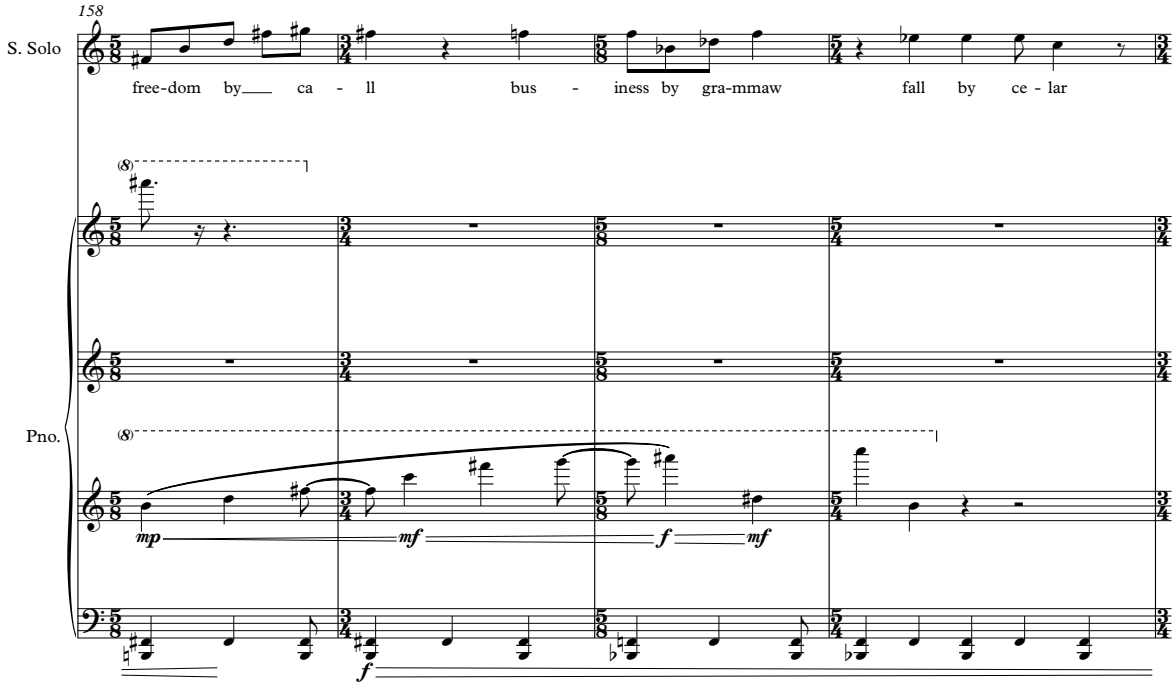

G
140
S. Solo
Pno.
space by train nor - folk by line - bee by si - de
f
p
mf
f
mf
Ped.

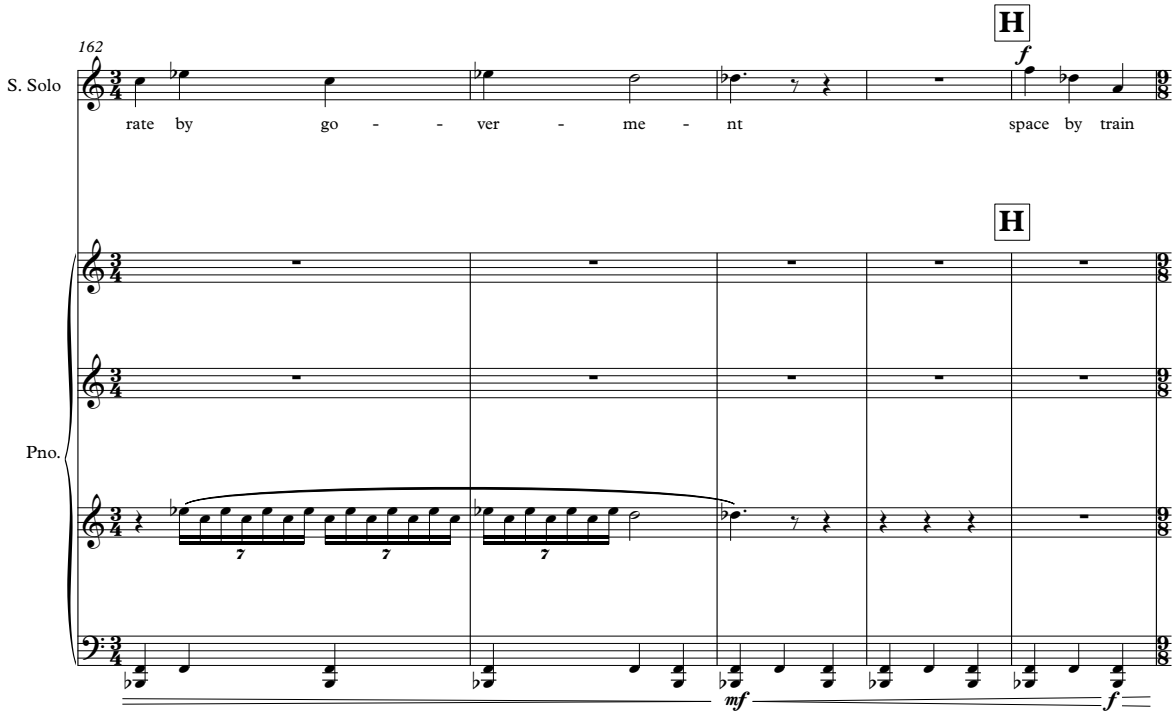

146
S. Solo
Pno.
fa - rm by Myr - tle space by train norm by ce - le - ry
pp
pp
f
Ped.

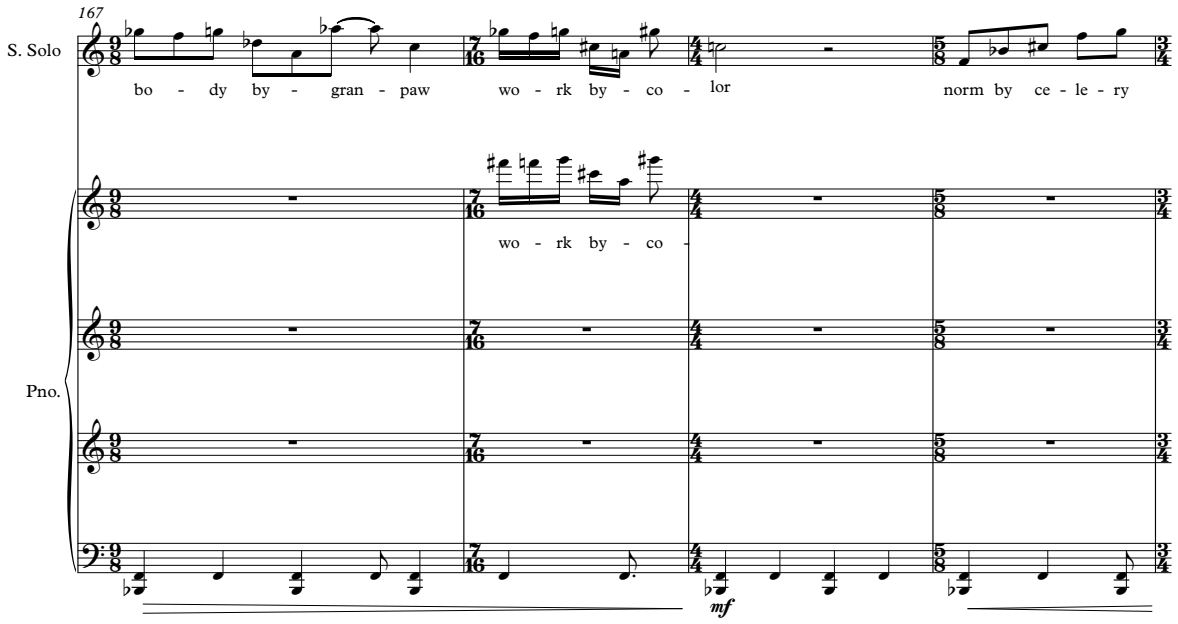
16

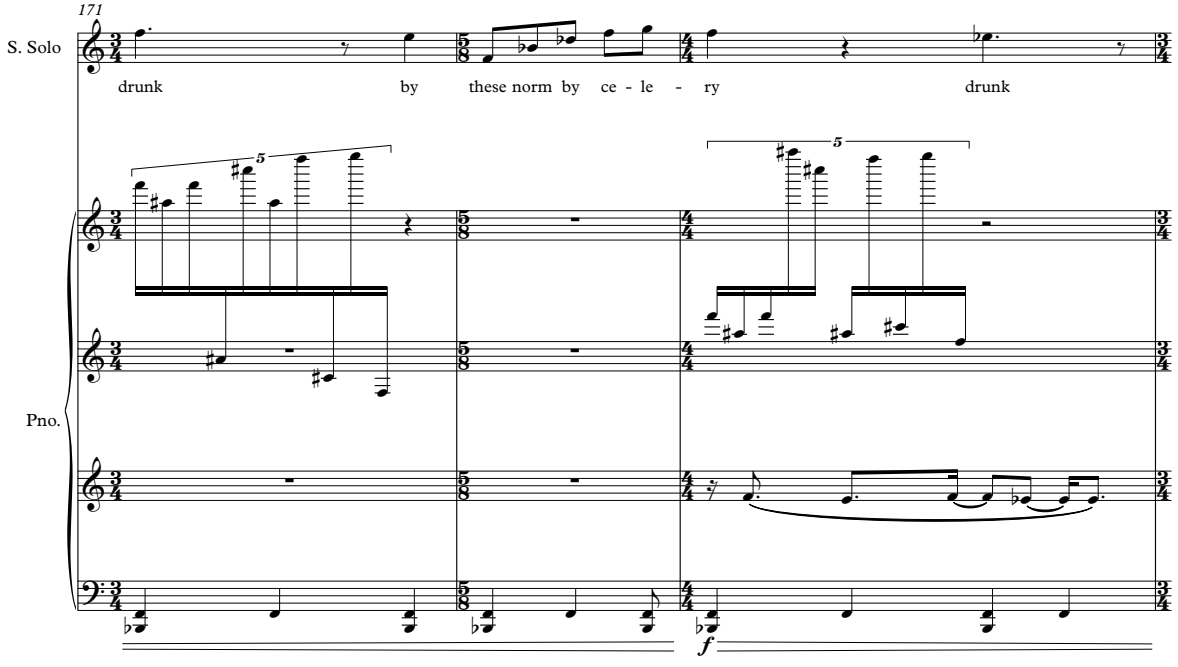

150
S. Solo
booth by crooks call by arms e - vic - ted by choice
f
Pno.
mf

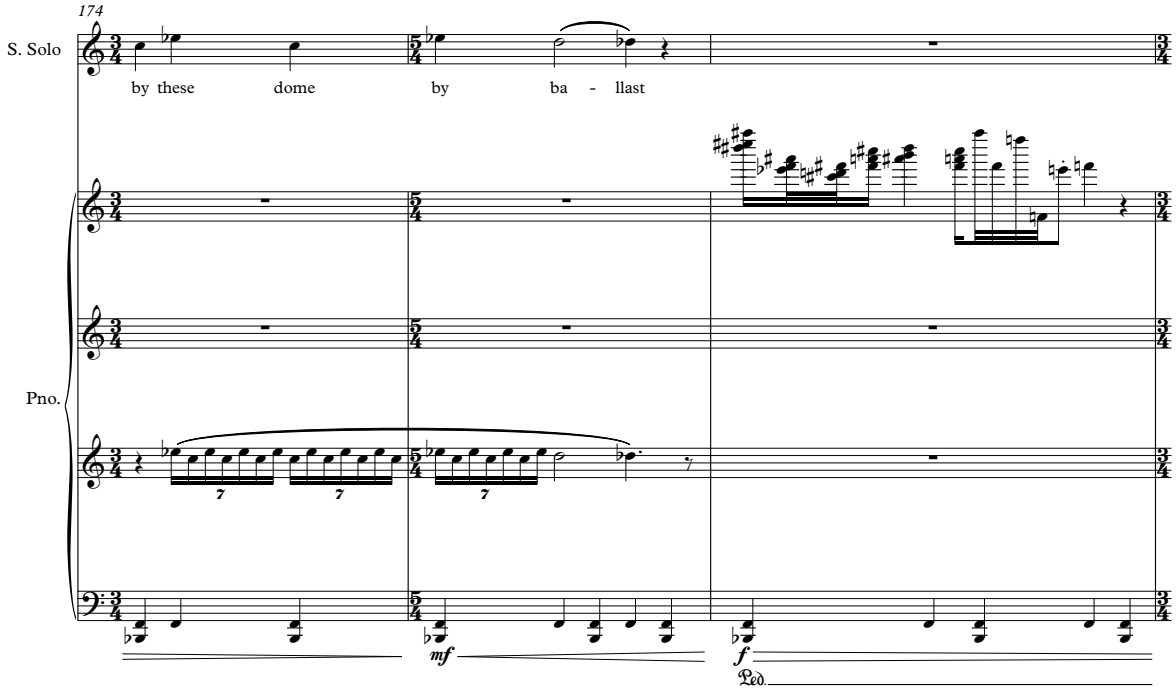

155
S. Solo
shot by ca - non norm by ce - le - ry norm by ce - le - ry
Pno.

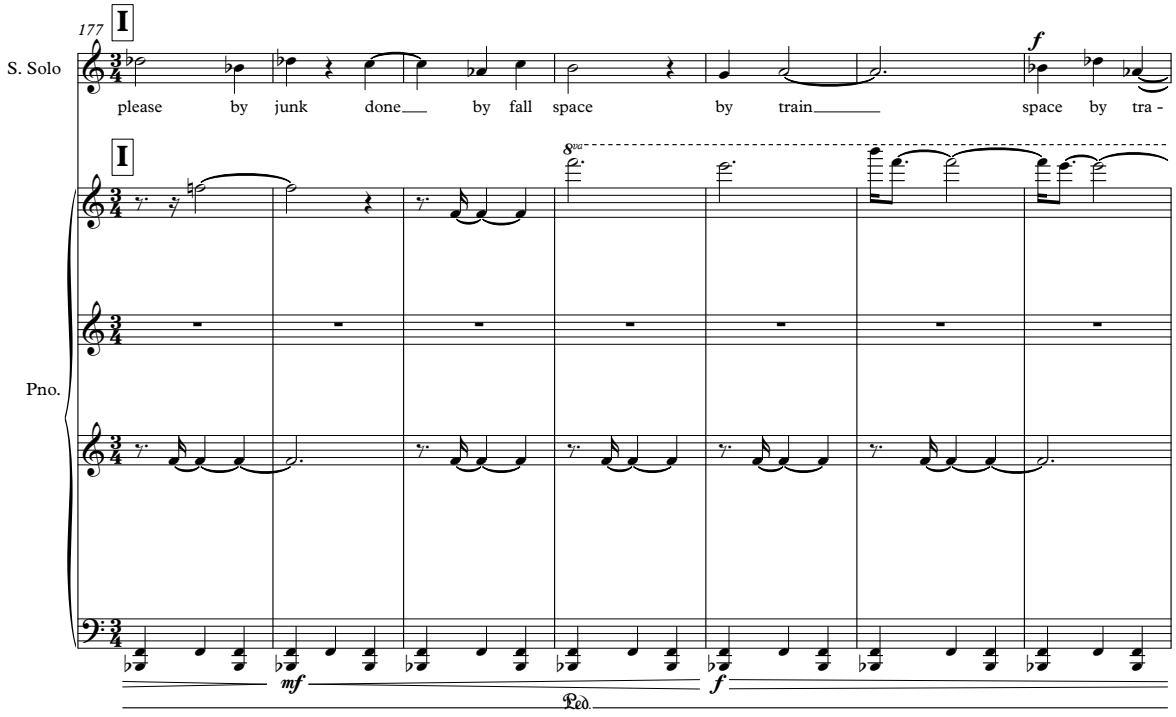

158
S. Solo
free-dom by ca - ll bus - iness by gra-mmaw fall by ce - lar
Pno.
mp
mf
f
mf
f

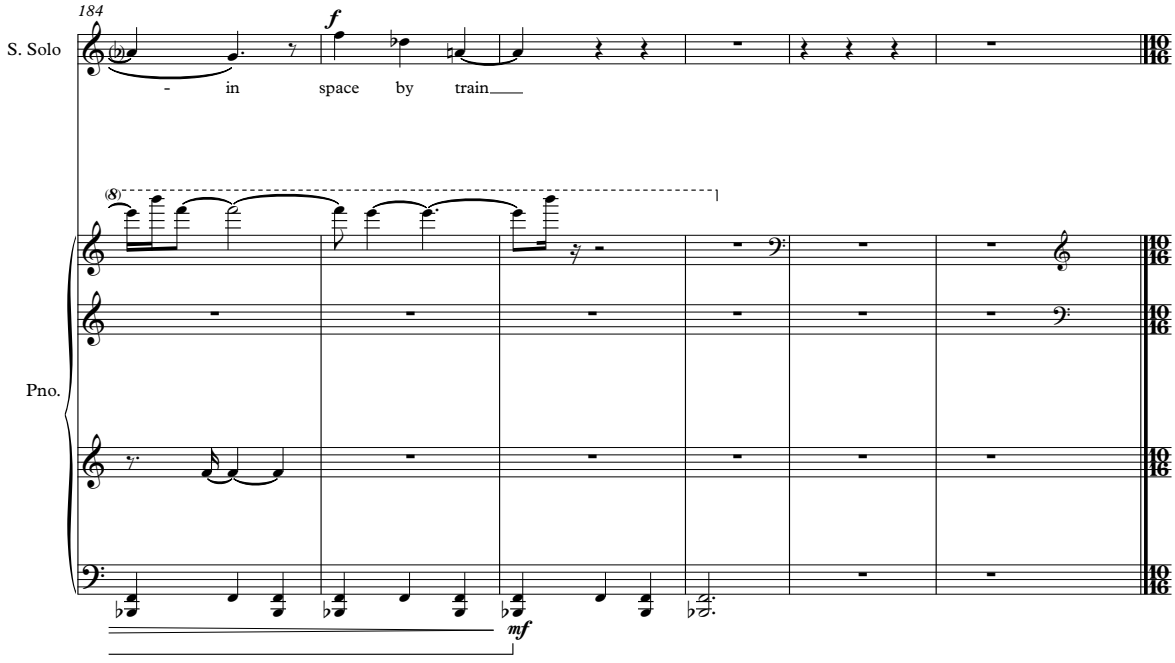

162
H
f
S. Solo
rate by go - - ver - me - nt space by train
H
Pno.
7
7
7
mf
f

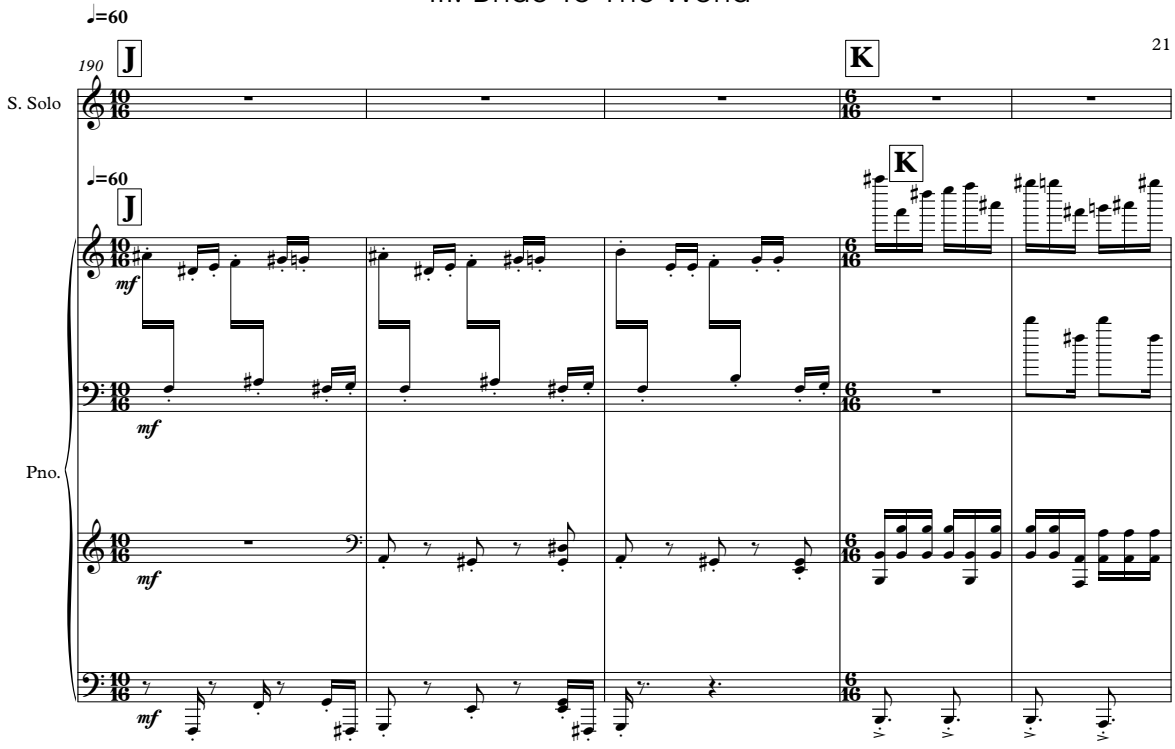

167
S. Solo
bo - dy by - gran - paw
wo - rk by - co - lor
norm by ce - le - ry
wo - rk by - co -
Pno.
mf

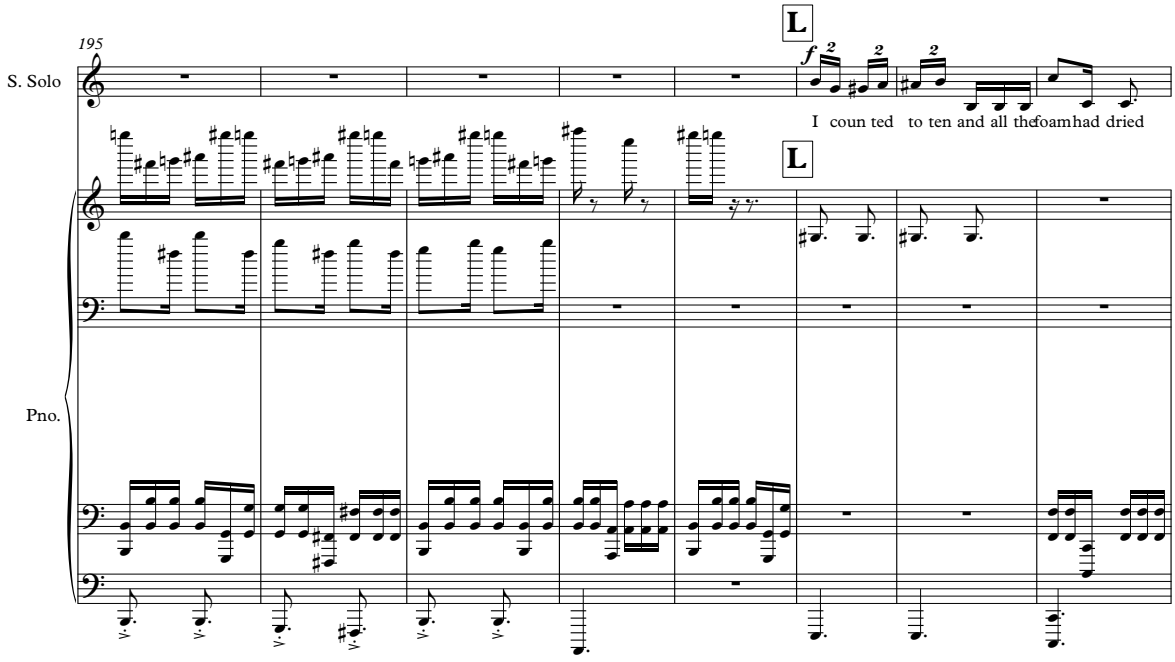

171
S. Solo
drunk
by
these norm by ce - le - ry
drunk
5
5
Pno.
f

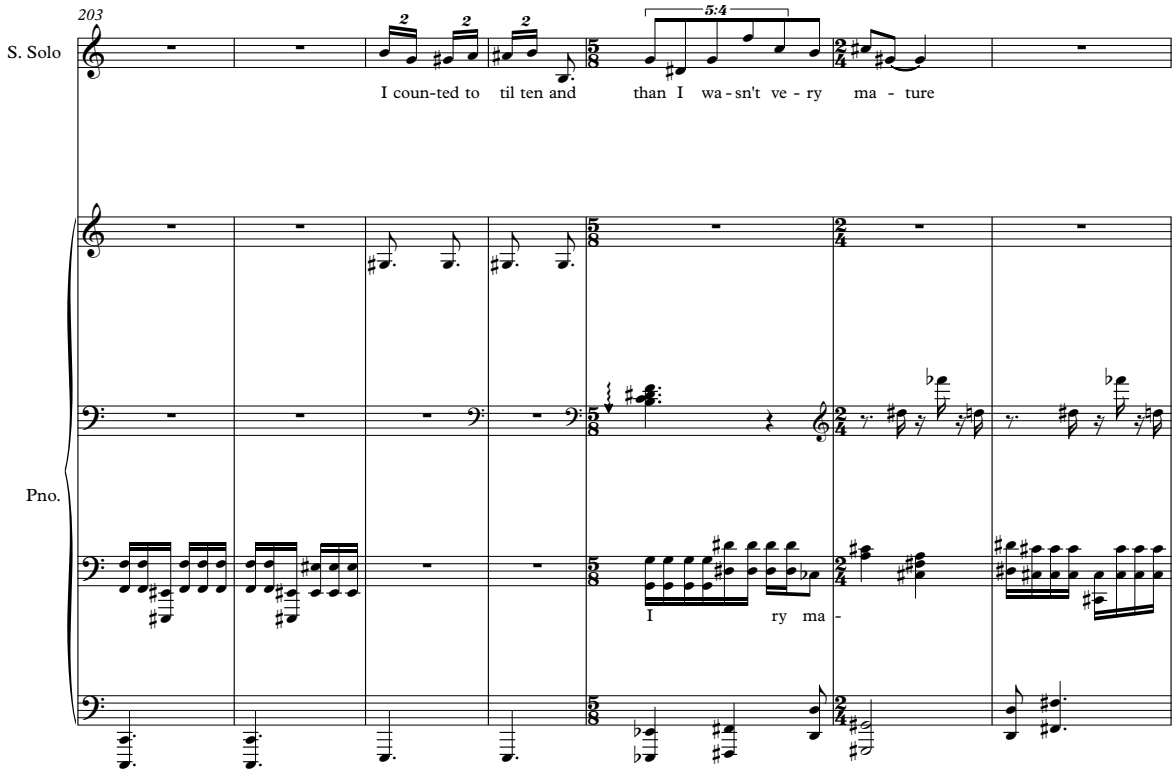

174
S. Solo
by these dome by ba - llast
Pno.
mf
f
Ped.

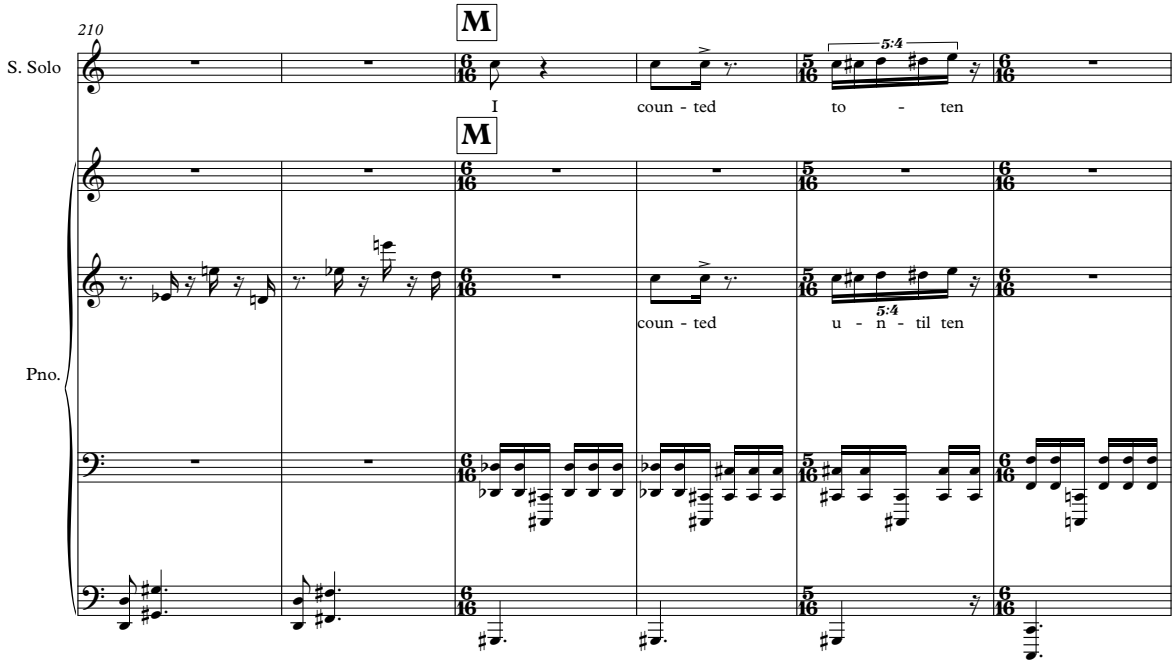

177
I
S. Solo
please by junk done by fall space by train space by tra -
I
8va
Pno.
mf
f
Ped.

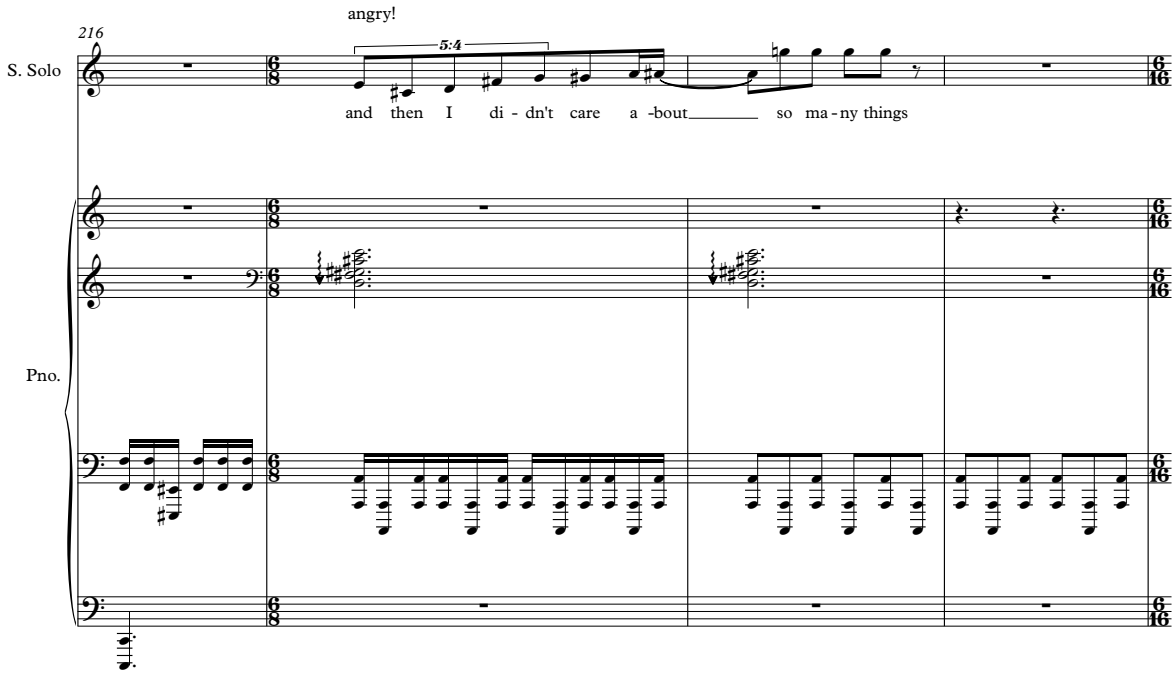

184
S. Solo
f
- in space by train
(8)
Pno.
mf

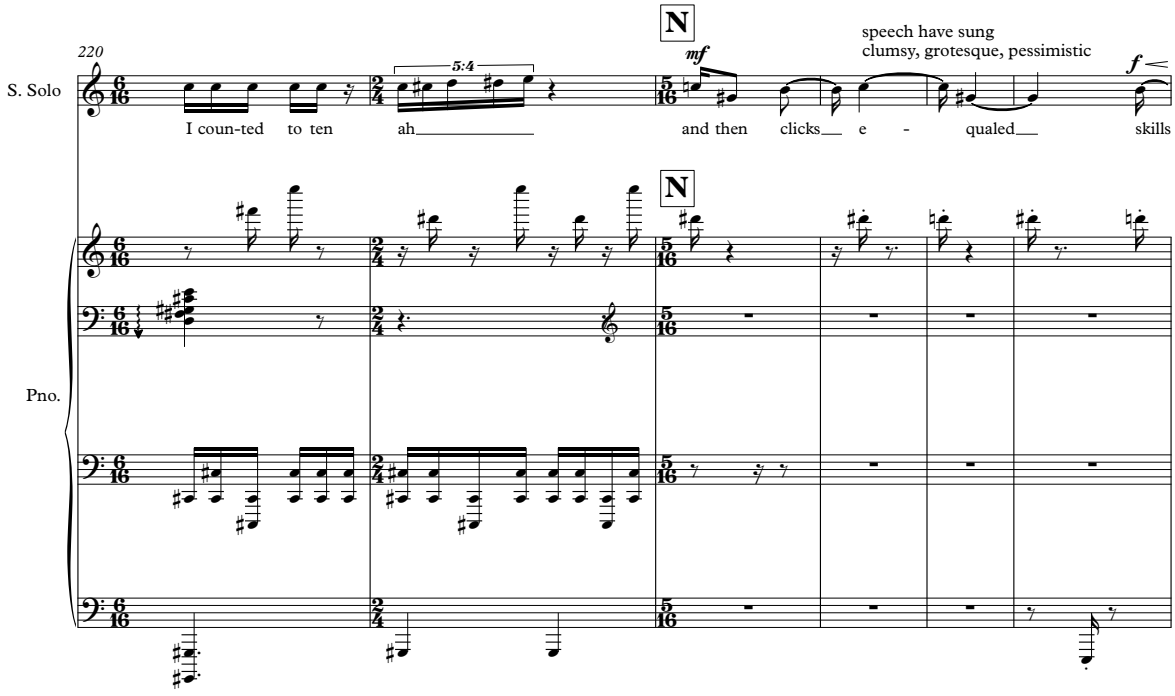

♩=60
190
J
K
S. Solo
Pno.
mf

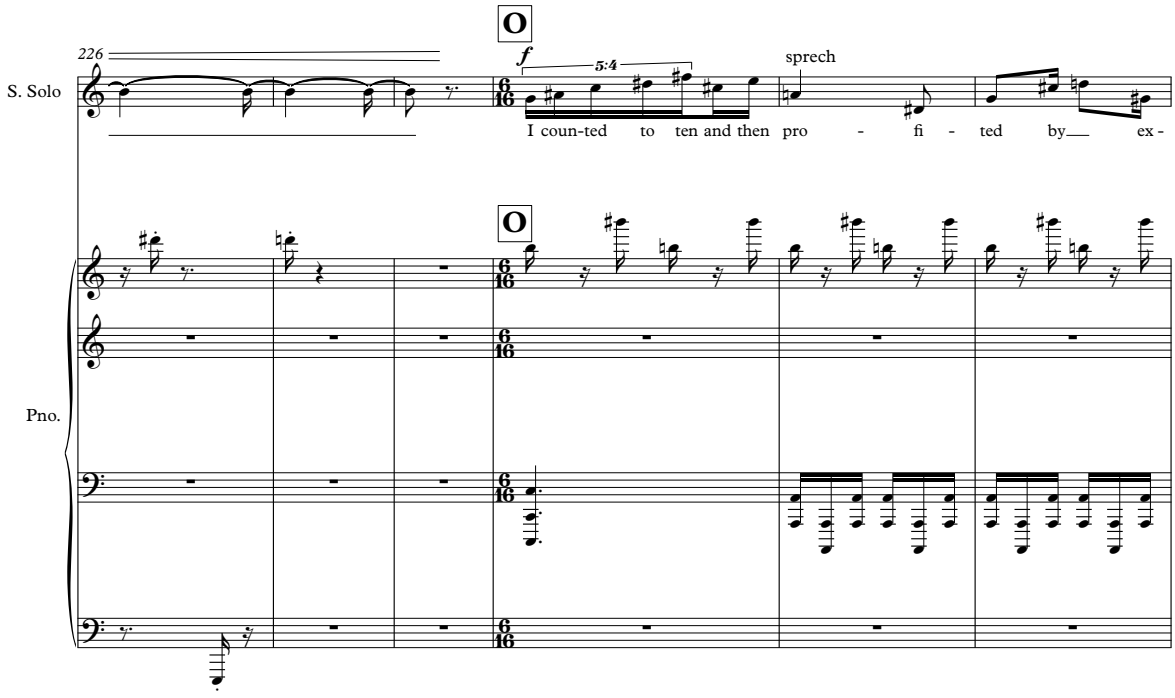

195
L
S. Solo
Pno.
f
I coun ted to ten and all the foam had dried

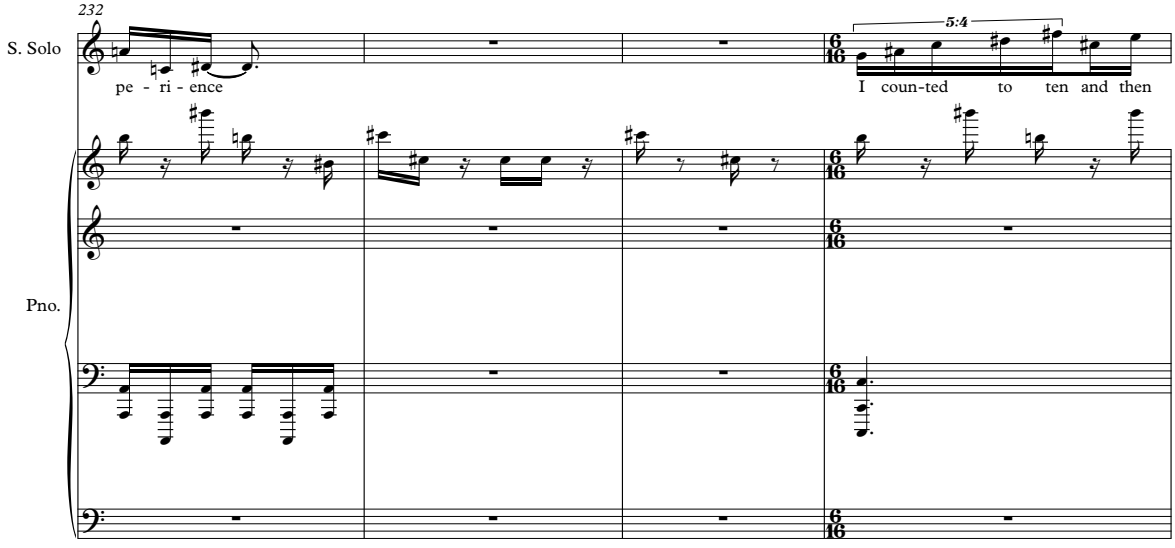

203
S. Solo
I coun-ted to til ten and than I wa - sn't ve - ry ma - ture
Pno.
I ry ma -

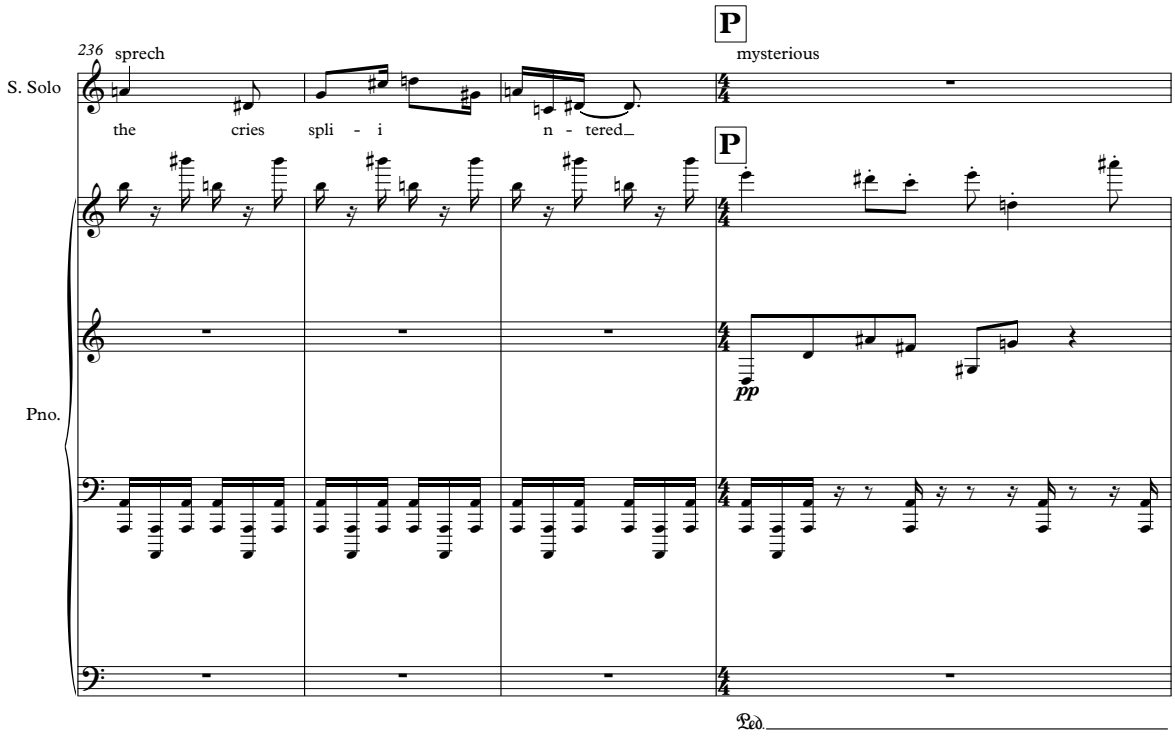

210
S. Solo
M
I coun - ted to - ten
M
coun - ted u - n - til ten
Pno.

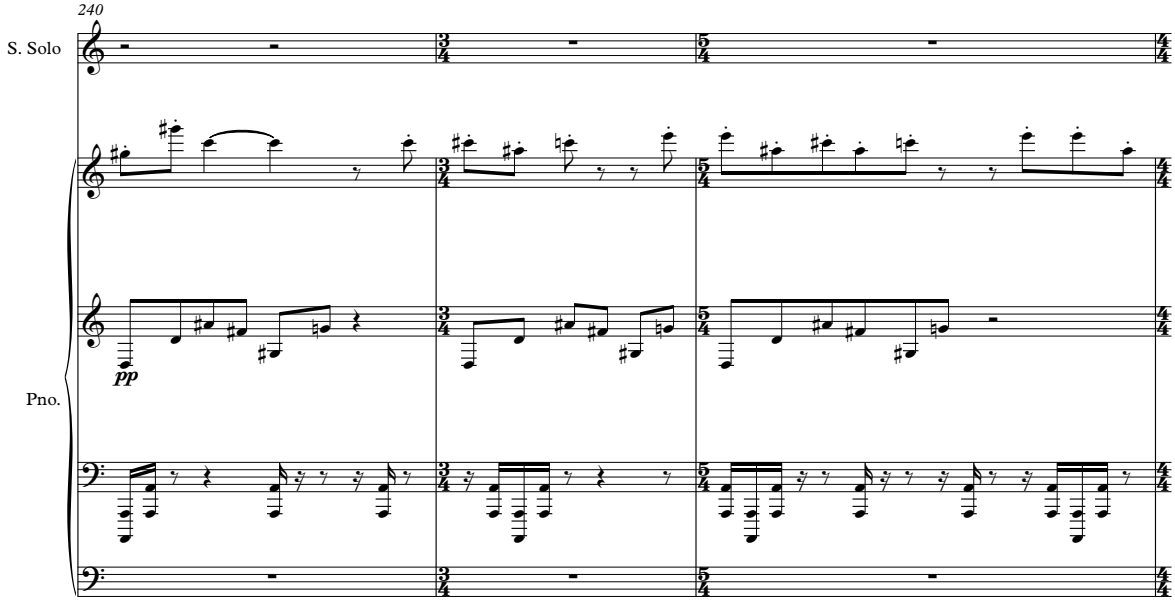

angry!
216
S. Solo
5:4
and then I di - dn't care a -bout so ma - ny things
Pno.

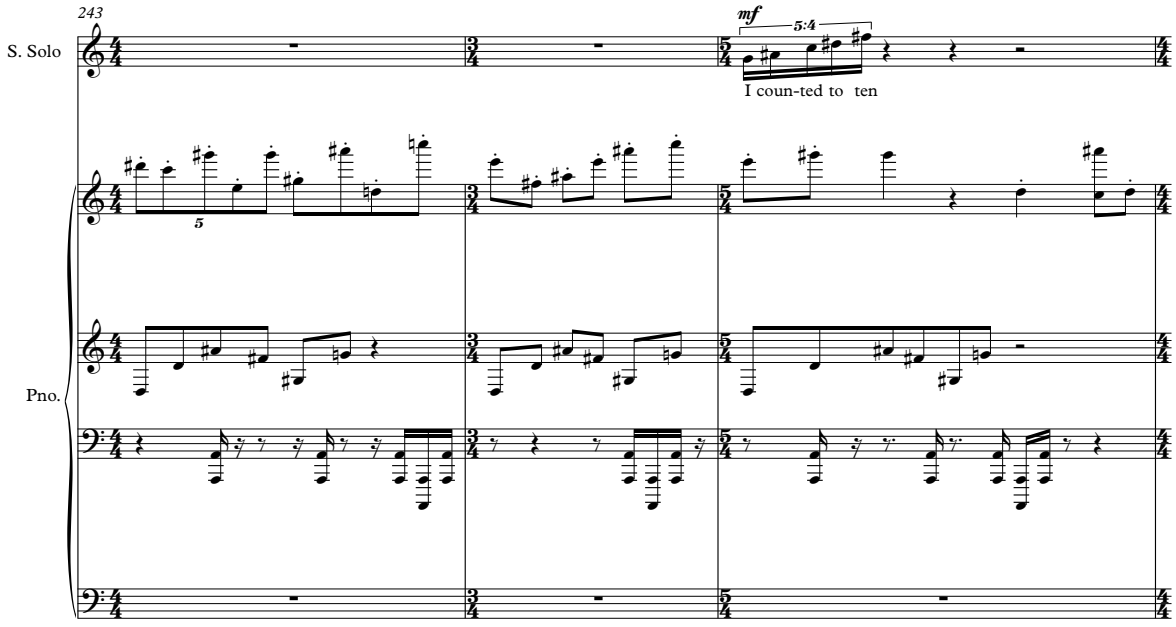

N
mf
speech have sung
clumsy, grotesque, pessimistic
f
220
S. Solo
5:4
I coun-ted to ten ah and then clicks e - qualed skills
N
Pno.

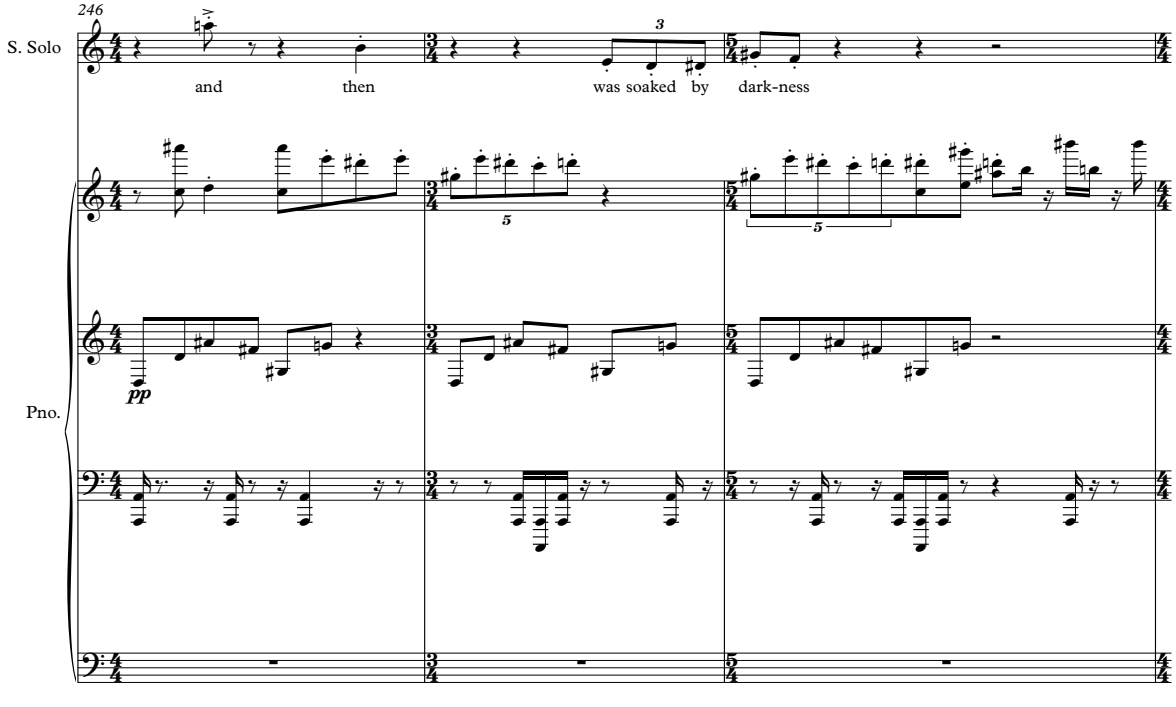

226
S. Solo
Pno.
f
5:4
sprech
I coun-ted to ten and then pro - fi - ted by ex -

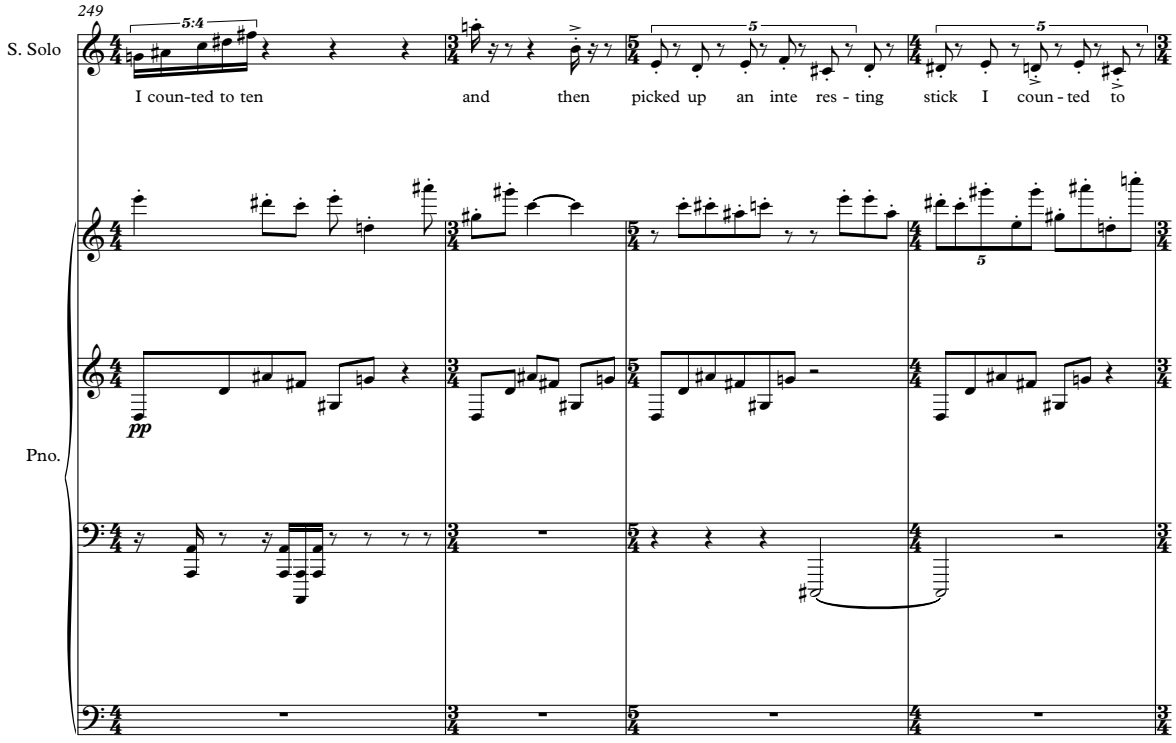

232
S. Solo
Pno.
5:4
pe - ri - ence
I coun-ted to ten and then

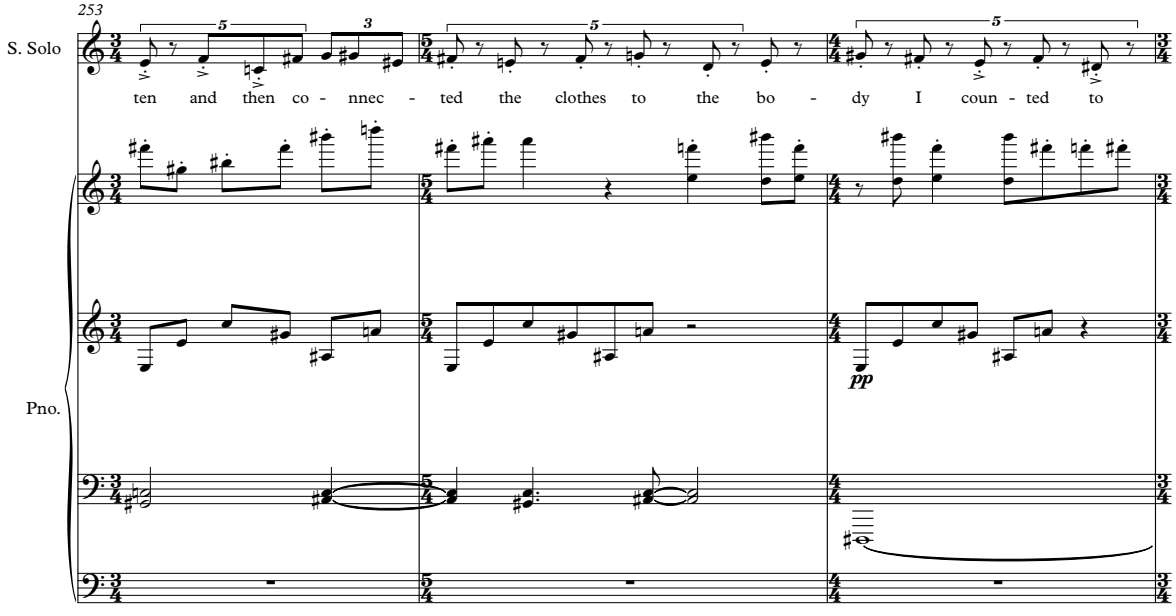

236
sprech
P
mysterious
S. Solo
the cries spli - i n - tered
P
pp
Pno.
Ped.


240
S. Solo
pp
Pno.


243
S. Solo
Pno.
mf
5:4
I coun-ted to ten


246
S. Solo
Pno.
pp
and then was soaked by dark-ness


249
S. Solo
Pno.
5:4
5
5
5
I coun-ted to ten
and
then
picked up
an
inte res - ting
stick
I
coun - ted
to
pp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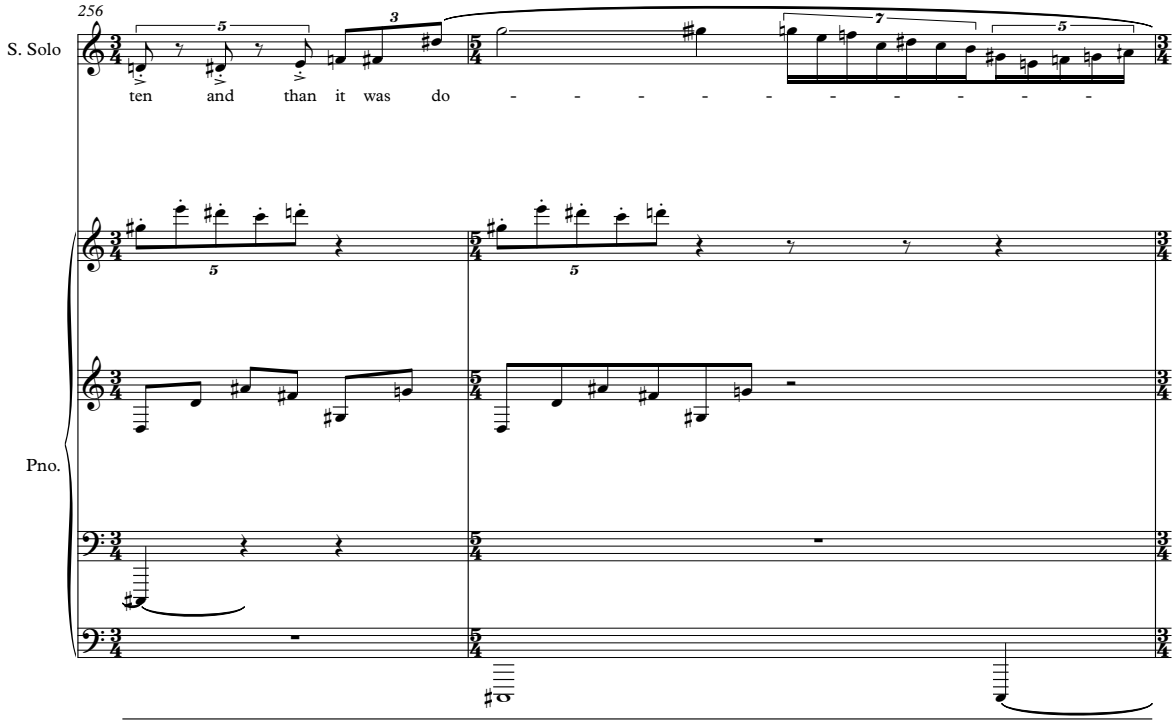
256
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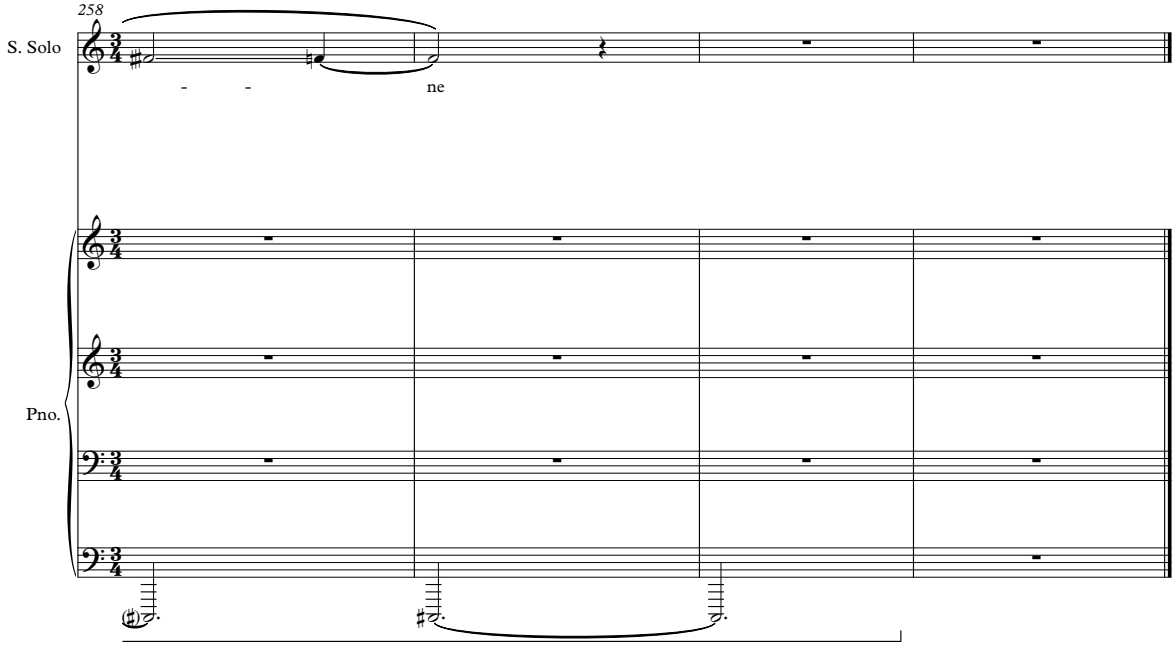
258
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C.7

Homage to Phantom of Liberty by Bunuel (2017)

For Fixed Media

Ori Barel

Homage to Phantom of Liberty by Bunuel Fixed

Media and Live Electronics

Format: Audio
Duration: 13:40

C.8

Cellular Automata Variations (2016)

For Fixed Media

Ori Barel

Cellular Automata Variations

Fixed Media

Format: Audio
Duration: 5:56

Appendix D - Audio Clips of Scores

D.1 24 Shrinking Miniatures – For Player Piano

D.2 Marco at the Record Store – For Vibraphone, Flute, Tenor Saxophone, Cello and Fixed Media

D.3 Smalltown – For Solo Piano
Piano – Kacey Link

D.4 Death of a Moon – For Seven Contrabasses and Fixed Media
Contrabass – Eran Borovich

D.5 Trichromatic – For Electric Guitar
Electric Guitar – Seth Josel

D.6 Three Poems by Andrew Choate – For Soprano, Player Piano and Fixed Media
Soprano – Kyra Folk-Farber

D.7 Homage to Phantom of Liberty by Bunuel – Fixed Media

D.8 Cellular Automata Variations – Fixed Media